Initial Application Part I

Received: **11/27/2019**

This application is placed in file for record. It MAY or MAY NOT have been reviewed to be determined Administratively Complete

KNMUC-191127-C-1080

Revised March 23, 2017

RECEIVED:	REVIEWER:	TYPE:	APP NO:
11/27/19	BLL	SWD	pBL1933635804

ABOVE THIS TABLE FOR OCD DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION
- Geological & Engineering Bureau –
1220 South St. Francis Drive, Santa Fe, NM 87505

ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Applicant: Trove Energy and Water, LLC **OGRID Number:** 372488
Well Name: Snowman Federal SWD No.1 **API:** 30-015-xxxxx
Pool: Proposed: SWD; Devonian-Silurian **Pool Code:** 97869

SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED BELOW

1) **TYPE OF APPLICATION:** Check those which apply for [A]
A. Location – Spacing Unit – Simultaneous Dedication
☐ NSL ☐ NSP (PROJECT AREA) ☐ NSP (PRORATION UNIT) ☐ SD

SWD-2340

B. Check one only for [I] or [II]
[I] Commingling – Storage – Measurement
☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM
[II] Injection – Disposal – Pressure Increase – Enhanced Oil Recovery
☐ WFX ☐ PMX ☒ SWD ☐ IPI ☐ EOR ☐ PPR

FOR OCD ONLY
☐ Notice Complete
☐ Application Content Complete

2) **NOTIFICATION REQUIRED TO:** Check those which apply.
A. ☒ Offset operators or lease holders
B. ☐ Royalty, overriding royalty owners, revenue owners
C. ☒ Application requires published notice
D. ☒ Notification and/or concurrent approval by SLO
E. ☒ Notification and/or concurrent approval by BLM
F. ☒ Surface owner
G. ☒ For all of the above, proof of notification or publication is attached, and/or,
H. ☐ No notice required

3) **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

Ben Stone
Print or Type Name


Signature

11/26/2019
Date

903-488-9850
Phone Number

ben@sosconsulting.us
e-mail Address

SOS Consulting, LLC
Oil & Gas Accounting - Regulatory Processing Assistance - Oil Field Technical Assistance
12 Years of Quality Service

November 26, 2019

New Mexico Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Attn: Ms. Adrienne Sandoval, Director

Re: Application of Trove Energy and Water, LLC to permit for salt water disposal the proposed Snowman Federal SWD No.1, located in Section 18, Township 26 South, Range 31 East, NMPM, Eddy County, New Mexico.

Dear Ms. Sandoval,

Please find the enclosed form C-108 Application for Authority to Inject, supporting the above-referenced request for salt water disposal. The well will be operated as a commercial endeavor offering operators in the area additional options for produced water disposal.

Trove Energy and Water is a developing salt water disposal services to operators in southeast New Mexico and seeks to optimize efficiency, both economically and operationally, of all its operations. Approval of this application is consistent with that goal as well as the NMOCD's mission of preventing waste and protection of correlative rights.

This application for a proposed Devonian SWD interval includes the currently mandated increased One-Mile Area of Review including pertinent and available seismic information for the area and region. Published legal notice ran November 13, 2019 in the Hobbs News Sun and all offset operators and other affected parties have been notified individually. The legal notice affidavit is included with this application. The application also includes a wellbore schematic, area of review maps, affected party plat and other required information for a complete Form C-108. The well is located on federal surface and minerals and the Bureau of Land Management CFO and offset operators have been notified of this application.

I respectfully request that the approval of this salt water disposal well proceed swiftly and if you or your staff requires additional information or has any questions, please do not hesitate to call or email me.

Best regards,

Ben Stone, Partner
SOS Consulting, LLC
Agent for Trove Energy and Water, LLC

Cc: Application attachment and file

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

FORM C-108
Revised June 10, 2003

APPLICATION FOR AUTHORIZATION TO INJECT

I. PURPOSE: ***Salt Water Disposal*** and the application ***QUALIFIES*** for administrative approval.

II. OPERATOR: ***Trove Energy and Water, LLC***
ADDRESS: ***1919 North Turner, Hobbs, NM 88240***

CONTACT PARTY: ***Agent: SOS Consulting, LLC – Ben Stone (903) 488-9850***

III. WELL DATA: ***All well data and applicable wellbore diagrams are ATTACHED.***

IV. ***This is not an expansion of an existing project.***

V. ***A map is attached*** that identifies all wells and leases within two miles of any proposed injection well with a ***ONE-Mile*** radius circle drawn around each proposed injection well. This circle identifies the well's area of review.

*VI. A tabulation is attached of data on all wells of public record within the area of review which penetrate the proposed injection zone. ***There are NO (0) Wells in the subject AOR which Penetrate the proposed Devonian interval.*** The data includes a description of each well's type, construction, date drilled, location, depth, and a schematic of any plugged well illustrating all plugging detail. ***NO P&A Wells penetrate.***

VII. ***The following data is ATTACHED*** on the proposed operation, including:

1. Proposed average and maximum daily rate and volume of fluids to be injected;
2. Whether the system is open or closed;
3. Proposed average and maximum injection pressure;
4. Sources and an appropriate analysis of injection fluid and compatibility with the receiving formation if other than reinjected produced water; and,
5. If injection is for disposal purposes into a zone not productive of oil or gas at or within one mile of the proposed well, attach a chemical analysis of the disposal zone formation water (may be measured or inferred from existing literature, studies, nearby wells, etc.).

*VIII. ***Appropriate geologic data on the injection zone is ATTACHED*** including appropriate lithologic detail, geologic name, thickness, and depth. Give the geologic name, and depth to bottom of all underground sources of drinking water (aquifers containing waters with total dissolved solids concentrations of 10,000 mg/l or less) overlying the proposed injection zone as well as any such sources known to be immediately underlying the injection interval.

IX. ***Stimulation program – a conventional acid job may be performed to clean and open the formation.***

*X. Attach appropriate logging and test data on the well. (If well logs have been filed with the Division, they need not be resubmitted). ***Well Logs will be filed with OCD.***

*XI. ***There is 1 water well/ PODs within one mile of the proposed salt water disposal well. Representative analyses are included herein and one or both of the subject wells will be sampled and analyzed and submitted.***

XII. ***An affirmative statement is ATTACHED that available geologic and engineering data has been examined and no evidence was found*** of open faults or any other hydrologic connection between the disposal zone and any underground sources of drinking water.

XIII. ***"Proof of Notice" section on the next page of this form has been completed and ATTACHED. There are 5 offset lessees and/or mineral owners within 1 mile, federal and state minerals - all have been noticed. Well location is Federal.***

XIV. Certification: I hereby certify that the information submitted with this application is true and correct to the best of my knowledge and belief.

NAME: ***Ben Stone*** TITLE: ***SOS Consulting, LLC agent for Trove Energy and Water, LLC***

SIGNATURE:  DATE: ***11/26/2019***

E-MAIL ADDRESS: ***ben@sosconsulting.us***

* If the information required under Sections VI, VIII, X, and XI above has been previously submitted, it need not be resubmitted. Please show the date and circumstances of the earlier submittal:

DISTRIBUTION: Original and one copy to Santa Fe with one copy to the appropriate District Office

FORM C-108 – APPLICATION FOR AUTHORIZATION TO INJECT (cont.)

III. WELL DATA – ***The following information and data is included (See ATTACHED Wellbore Schematic):***

A. The following well data must be submitted for each injection well covered by this application. The data must be both in tabular and schematic form and shall include:

(1) Lease name; Well No., Location by Section, Township and Range; and footage location within the section.

(2) Each casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.

(3) A description of the tubing to be used including its size, lining material, and setting depth.

(4) The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.

Division District Offices have supplies of Well Data Sheets which may be used or which may be used as models for this purpose. Applicants for several identical wells may submit a "typical data sheet" rather than submitting the data for each well.

B. The following must be submitted for each injection well covered by this application. All items must be addressed for the initial well. Responses for additional wells need be shown only when different. Information shown on schematics need not be repeated.

(1) The name of the injection formation and, if applicable, the field or pool name.

(2) The injection interval and whether it is perforated or open-hole.

(3) State if the well was drilled for injection or, if not, the original purpose of the well.

(4) Give the depths of any other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.

(5) Give the depth to and the name of the next higher and next lower oil or gas zone in the area of the well, if any.

XIV. PROOF OF NOTICE ***pursuant to the following criteria is ATTACHED.***

All applicants must furnish proof that a copy of the application has been furnished, by certified or registered mail, to the owner of the surface of the land on which the well is to be located and to each leasehold operator within one-half mile of the well location.

Where an application is subject to administrative approval, a proof of publication must be submitted. Such proof shall consist of a copy of the legal advertisement which was published in the county in which the well is located. The contents of such advertisement must include:

(1) The name, address, phone number, and contact party for the applicant;

(2) The intended purpose of the injection well; with the exact location of single wells or the Section, Township, and Range location of multiple wells;

(3) The formation name and depth with expected maximum injection rates and pressures; and,

(4) A notation that interested parties must file objections or requests for hearing with the Oil Conservation Division, 1220 South St. Francis Dr., Santa Fe, New Mexico 87505, within 15 days.

NO ACTION WILL BE TAKEN ON THE APPLICATION UNTIL PROPER PROOF OF NOTICE HAS BEEN SUBMITTED.

NOTICE: Surface owners or offset operators must file any objections or requests for hearing of administrative applications within 15 days from the date this application was mailed to them.

C-108 - Items III, IV, V

Item III - Subject Well Data

Wellbore Diagram - PROPOSED

Item IV – Tabulation of AOR Wells

NO wells penetrate the proposed injection interval.

Item V – Area of Review Maps

1. Two Mile AOR Map with One-Mile Fresh Water Well Radius

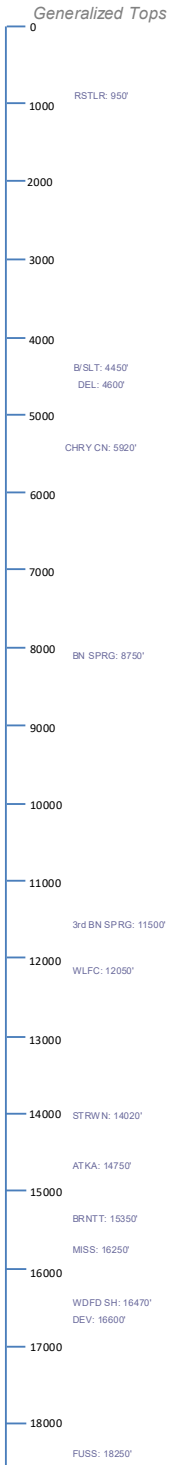
2. One-Half Mile AOR Map

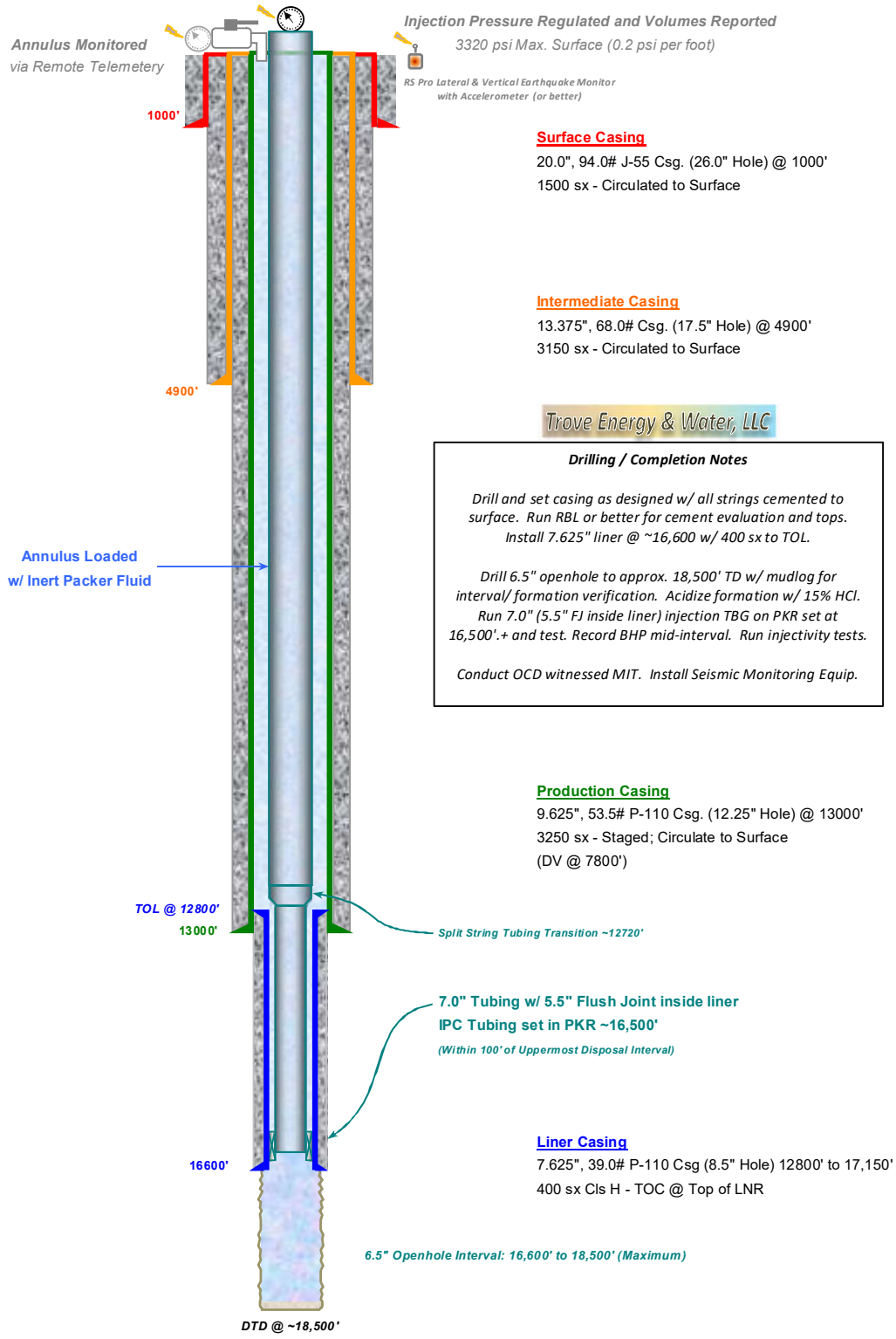
All Above Exhibits follow this page.

WELL SCHEMATIC - PROPOSED
Snowman Federal SWD Well No.1

API 30-015-xxxxx
1470' FNSL & 150' FWL, SEC. 18-T26S-R31E
EDDY COUNTY, NEW MEXICO

SWD; Devonian-Silurian (97869)
Spud Date: 6/01/2020
SWD Config Dt: 7/15/2020





Surface Casing
20.0", 94.0# J-55 Csg. (26.0" Hole) @ 1000'
1500 sx - Circulated to Surface

Intermediate Casing
13.375", 68.0# Csg. (17.5" Hole) @ 4900'
3150 sx - Circulated to Surface

Trove Energy & Water, LLC

Drilling / Completion Notes

Drill and set casing as designed w/ all strings cemented to surface. Run RBL or better for cement evaluation and tops. Install 7.625" liner @ ~16,600 w/ 400 sx to TOL.

Drill 6.5" openhole to approx. 18,500' TD w/ mudlog for interval/ formation verification. Acidize formation w/ 15% HCl. Run 7.0" (5.5" FJ inside liner) injection TBG on PKR set at 16,500'.+ and test. Record BHP mid-interval. Run injectivity tests.

Conduct OCD witnessed MIT. Install Seismic Monitoring Equip.

Production Casing
9.625", 53.5# P-110 Csg. (12.25" Hole) @ 13000'
3250 sx - Staged; Circulate to Surface
(DV @ 7800')

Liner Casing
7.625", 39.0# P-110 Csg (8.5" Hole) 12800' to 17,150'
400 sx Cls H - TOC @ Top of LNR

Drawn by: Ben Stone, 11/26/2019

SOS Consulting, LLC

C-108 – Item III

Subject Well Data

Trove Energy and Water, LLC

Supporting Information for INCREASED TUBING SIZE

Justification

Anticipated Need for Disposal Capacity

Daily produced water will INCREASE annually and by 2025, expectations are for an additional 1.1 million barrels per day ***over current volumes***. It is estimated that 50 new SWDs need to be brought online in the Delaware Basin every year to meet the demand.

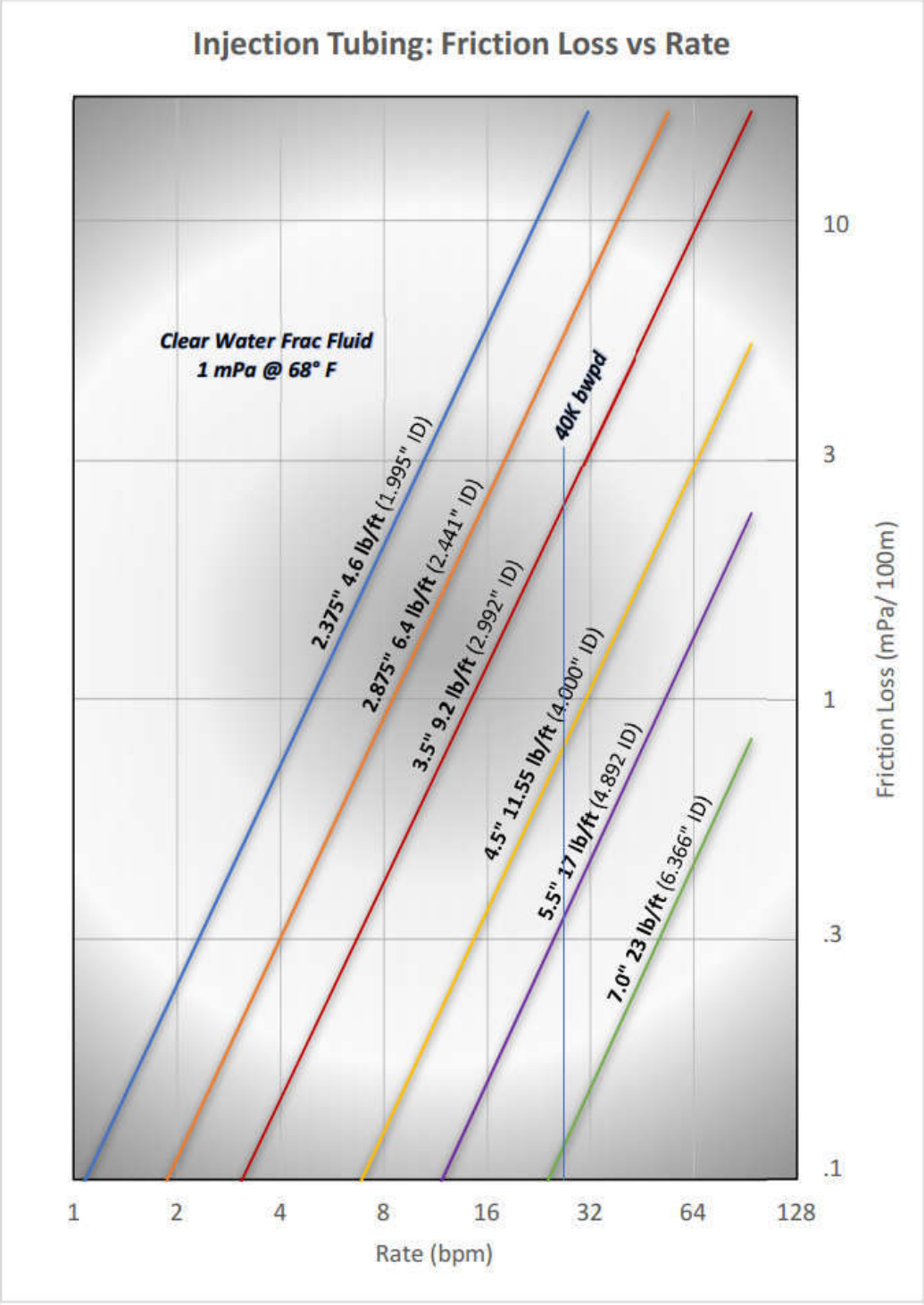
More Capacity – Fewer Wells – Increased Safety

Going from currently approved 5 ½-inch tubing strings to a full 7-inch string (5 ½" inside liner only) reduces friction by 300%; if upsizing from a 4 ½-inch string, friction is reduced by nearly 1000%. In any case, this allows operators to achieve the 40K to 50K bpd daily volumes with less horsepower and minimizing stress-induced mechanical failures from the tank battery, through the pump system and manifolds, to the well head and downhole. Lowering the chance for mechanical failure also enhances personnel safety. ***(See All Figures.)***

Larger Tubing Just Makes Sense for Today's Requirements

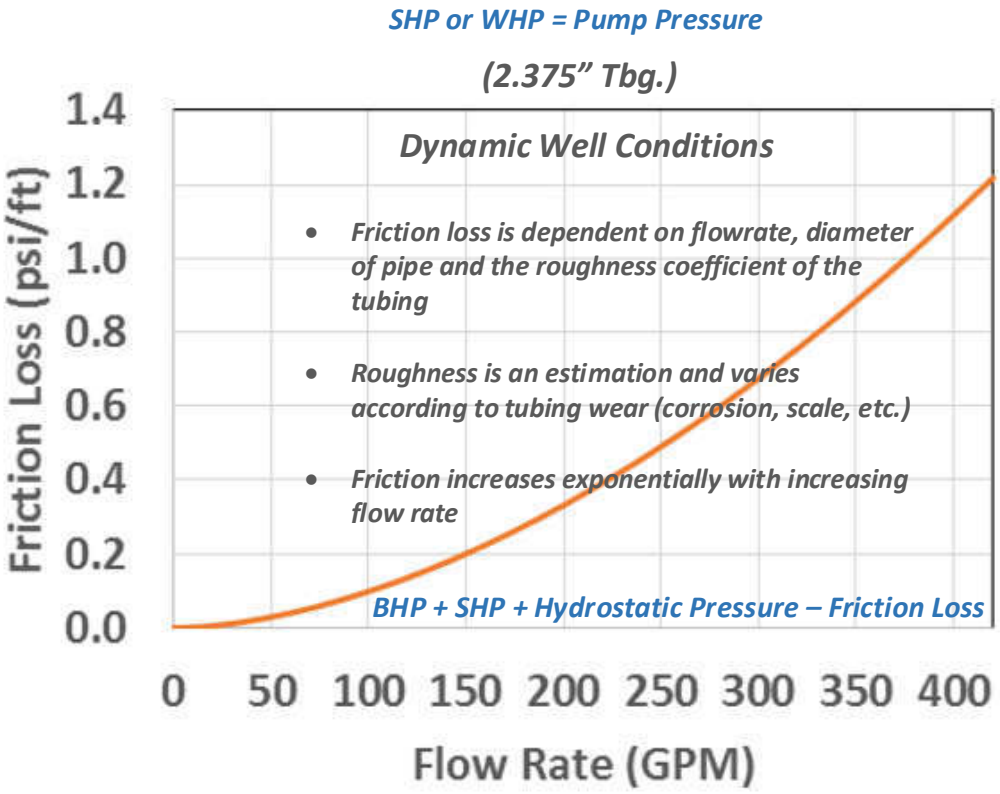
The risk of having to fish large diameter tubing from liner with close tolerance is challenging but, it has previously been well documented to the NMOCD that it can and has been performed successfully in many scenarios. Fishing tool companies have the tools to perform these jobs should the need arise. Some fishing jobs are tricky to be sure however; a sequence of events for 5 ½" tubing to be dropped inside a 7 $^{5}/_{8}$" liner is rare – the benefits far outweigh the risks.

Figure 1



Following the 40K bwpd line, it is apparent that attempting to obtain this rate even with 3.5" tubing is unrealistic – equipment failures occur. The 7.0 tubing offers minimal friction loss thereby allowing increased rates downhole and less impact to equipment. A comfortable rate for 3.5" might be about 6.5 bpm or, less than 10K bwpd as an example.

Figure 2
Friction Loss Curve



Bourgoyne, Millhelm, Chenevert, Young, *Applied Drilling Engineering, 1991*

Figure 3

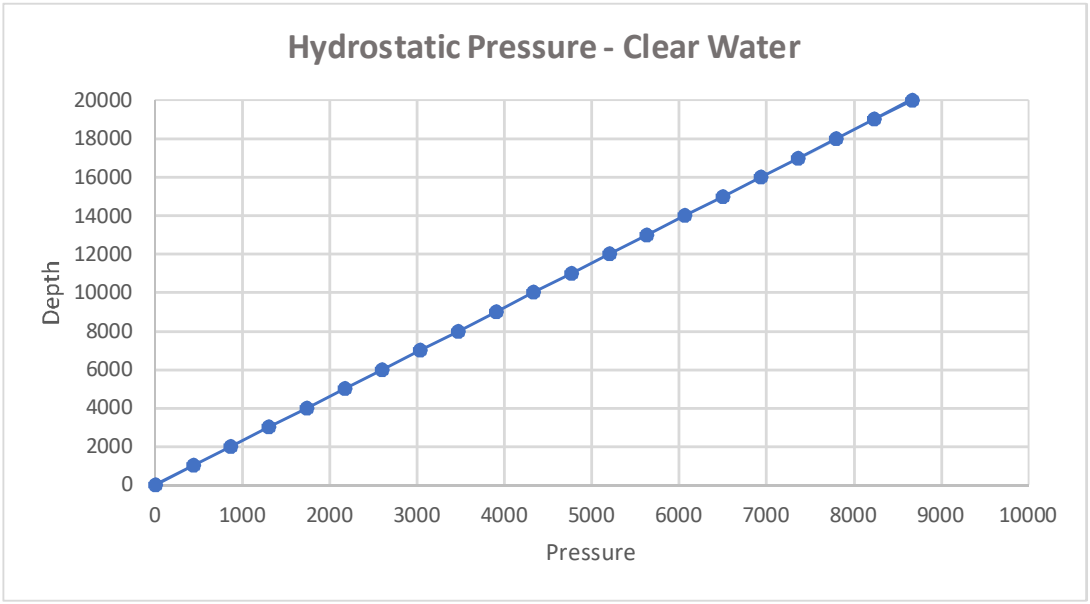
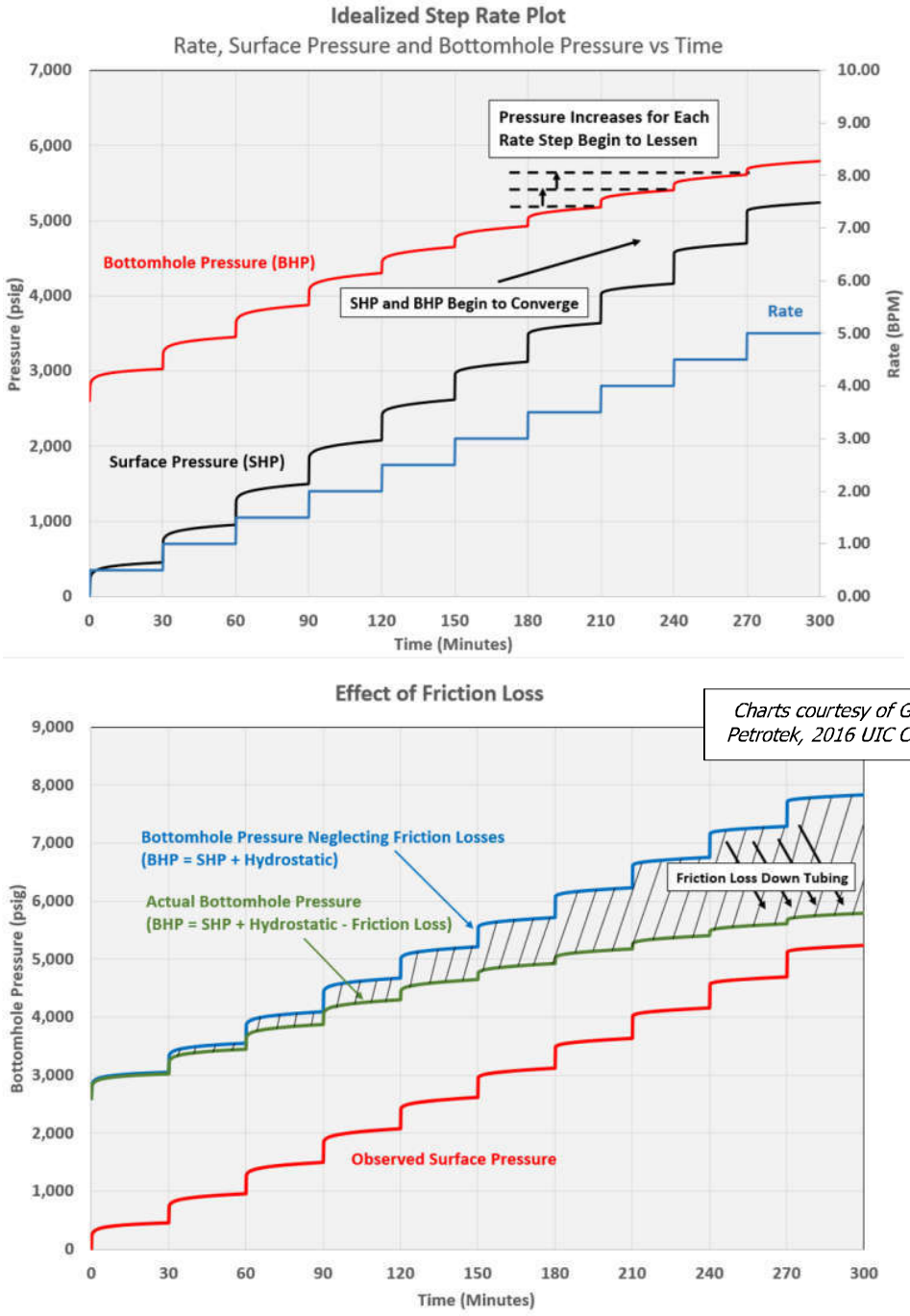


Figure 4

Step Rate Test Charts Depict Friction Loss



The above charts are theoretical *(shallow/ 2.375" TBG)* but clearly depict the relationship between surface and bottomhole pressures; the top chart compares to rate and the bottom chart to friction loss. As shown in ***Figure 1***, increasing tubing size reduces friction allowing a greater rate to reach the intended disposal interval and by using less horsepower.

Tubing Configuration Inside Liner

The larger 7" casing is run to within 3 joints of the liner-top so the reduced friction benefits are realized. Then, to get to the packer setting depth (within 100 feet of the liner shoe; top of openhole interval) the tubing is swaged and reduced to the final 2,000 to 4000 feet. Friction goes up but, the shorter final length keeps it manageable while delivering the needed volumes. ***(See Large Figure – Trove Generic Proposed Well Schematic)***

Specs – Tubing Inside Liner

5.5" 17.0# HCP-110 FJ	*OD*	*ID*	*Drift*	*Lined ID*	*Flare Drift*
	5.500	***4.982***	***4.767***	***4.520***	***4.275***
				Wall Thickness	*5.5" FJ Clearance*
7.625" 39.0# P-110 Liner	***7.625***	***6.625***	***6.500***	***0.500***	***1.125***

Fishing Procedures

A 6.625" O.D. Bowen Series 150 overshot *(Assembly 8625)* with a spiral grapple or equivalent would be utilized to perform an overshot operation. *(Note: The 6.625" O.D. will be turned down to 6.500" O.D. prior to commencing operation.)* Details on the overshot are shown below.

Outside Diameters 5.7/8" – 6.7/8" inclusive.

Complete Assembly with Spiral Parts Ref.	0588 C5171	0593 5737	0638 6655	0651 4773	0662 C4825	0663 8625	0687 C5174
Type	SH	FS	SH	SH	FS	SH	FS
Maximum Catch Size (Spiral)	5"	4.5/8"	5.1/4"	5.3/8"	5"	5.1/2"	5.1/4"
Maximum Catch Size (Basket)	4.1/2"	4"	4.5/8"	4.3/4"	4.1/4"	4.7/8"	4.1/2"
Assembly Weight (lbs.)	140	150	176	182	192	185	211
Overshot O/Dia.	5.7/8"	5.15/16"	6.3/8"	6.1/2"	6.5/8"	6.5/8"	6.7/8"
Top Sub	0588.1 A5172	0593.1 5738	0638.1 6656	0651.1 4774	0662.1 B4826	0663.1 8626	0687.1 A5175
Bowl	0588.2 B5173	0593.2 5735	0638.2 4503	0651.2 9205	0662.2 B4827	0663.2 8617	0687.2 B4519
Standard Guide	0588.3 B4371	0593.3 192	0638.3 4504	0651.3 4775	0662.3 L1074	0663.3 8621	0687.3 A4474
Spiral Grapple	0588.4 B4369	0593.4 196	0638.4 4498	0651.4 9207	0662.4 M1071	0663.4 8619	0687.4 B4472
Spiral Grapple Control	0588.5 B4370	0593.5 193	0638.5 4499	0651.5 9208	0662.5 M1072	0663.5 8620	0687.5 A4473
Packer	0588.6 L5950	0593.6 195	0638.6 4505	0651.6 9209	0662.6 L4505	0663.6 8618	0687.6 B4520
Basket Grapple	0588.7 B4369	0593.7 196	0638.7 4498	0651.7 9207	0662.7 M1071	0663.7 8619	0687.7 B4472
Basket Grapple Control	0588.8 B4370	0593.8 193	0638.8 4499	0651.8 9208	0662.8 M1072	0663.8 8620	0687.8 A4473
Control Packer	0588.9 L5950R	0593.9 195R	0638.9 4505R	0651.9 9209R	0662.9 M4505RS	0663.9 8618R	0687.9 B4520R
Mill Control Packer	0588.10 L5950R	0593.10 195R	0638.10 4505R	0651.10 9209R	0662.10 M4505RS	0663.10 8618R	0687.10 B4520R

(Note: Similar fishing tools are available from various manufactures; Bowen is a major manufacturer of many downhole tools and considered a standard.)

Fishing Procedure – Other Circumstances

Connection Break

If dressing is needed, trip in hole with a mill and mill connection to allow for turned-down overshot to be latched onto the body of the tubing. If no milling is required, trip in hole with overshot and latch onto fish. Once latched, pick up string weight and pull to release packer. Once packer is released, trip out of hole with fish.

Tubing Body Break

If dressing is needed, trip in hole with a mill and mill tubing to allow for turned-down overshot to be latched onto the body of the tubing. If no milling is required, trip in hole with turned-down overshot and latch onto fish. Once latched, pick up string weight and pull 1-2 points over hanging weight to release the packer (turn to release depending on model). Once packer is released, trip out of hole with fish. *(Note: Wash pipe and mill may be substituted for dressing-off a break to ensure pipe stabilization and that the casing is not damaged due to milling.)*

Mill Cannot be Used

If an inadequate fishing neck is looking up and a mill cannot be used to dress the fish, a cutting tool may be utilized to cut off the damaged portion of tubing and a spear used to retrieve the cut-off piece. Once the cut-off piece is retrieved, the turned-down overshot may be used to retrieve the fish and release the packer. *(Note: If pipe is severely damaged, this procedure may be repeated to retrieve the pipe in sections.)*

Spear Fishing Procedure

If a turned-down overshot cannot be used or the fishing neck is inadequate, a spear may be used to spear into the fish. In the case of insert-lined pipe, a smaller spear will be utilized to go inside the insert-liner and retrieve the lining. Once the lining has been removed, trip out of hole and pick up the proper sized spear for the subject pipe. Trip in hole with tubing spear, spear the fish, pick up string weight and pull 1-2 points over hanging weight to release the packer (turn to release depending on model). Trip out of hole with fish and packer assembly.

Abandonment Procedure

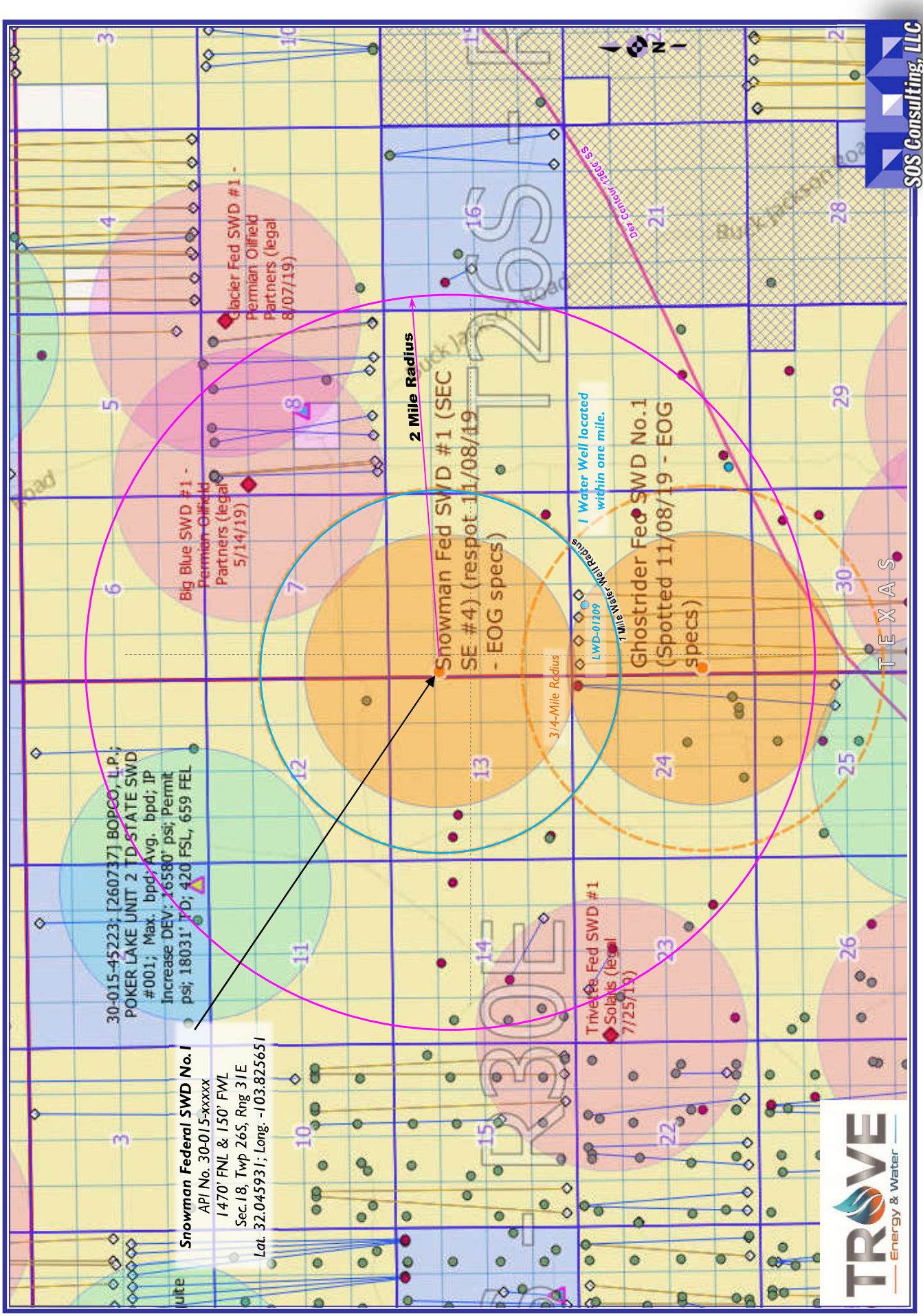
If all attempts to fish fail, the operator may decide to abandon the zone or well. The tubing would be perforated with squeeze holes. A cement retainer or other seal assemble would be set at the top of the pipe and cement pumped to fill the annulus between the tubing and liner. The zone would be abandoned and sealed from fluid migration. The operator may decide to sidetrack from an appropriate depth and retry.

Summary

An increase in tubing size to a 7” x 5.5” (inside liner) for **Trove Energy and Water’s** above-mentioned proposed SWDs will likely NOT result in increased potential for seismic activity in the region nor cause mechanical problems in the event tubing must be fished. Upsizing tubing diameters will reduce the number of SWDs required to accommodate the disposal needs of the industry in southeastern New Mexico.

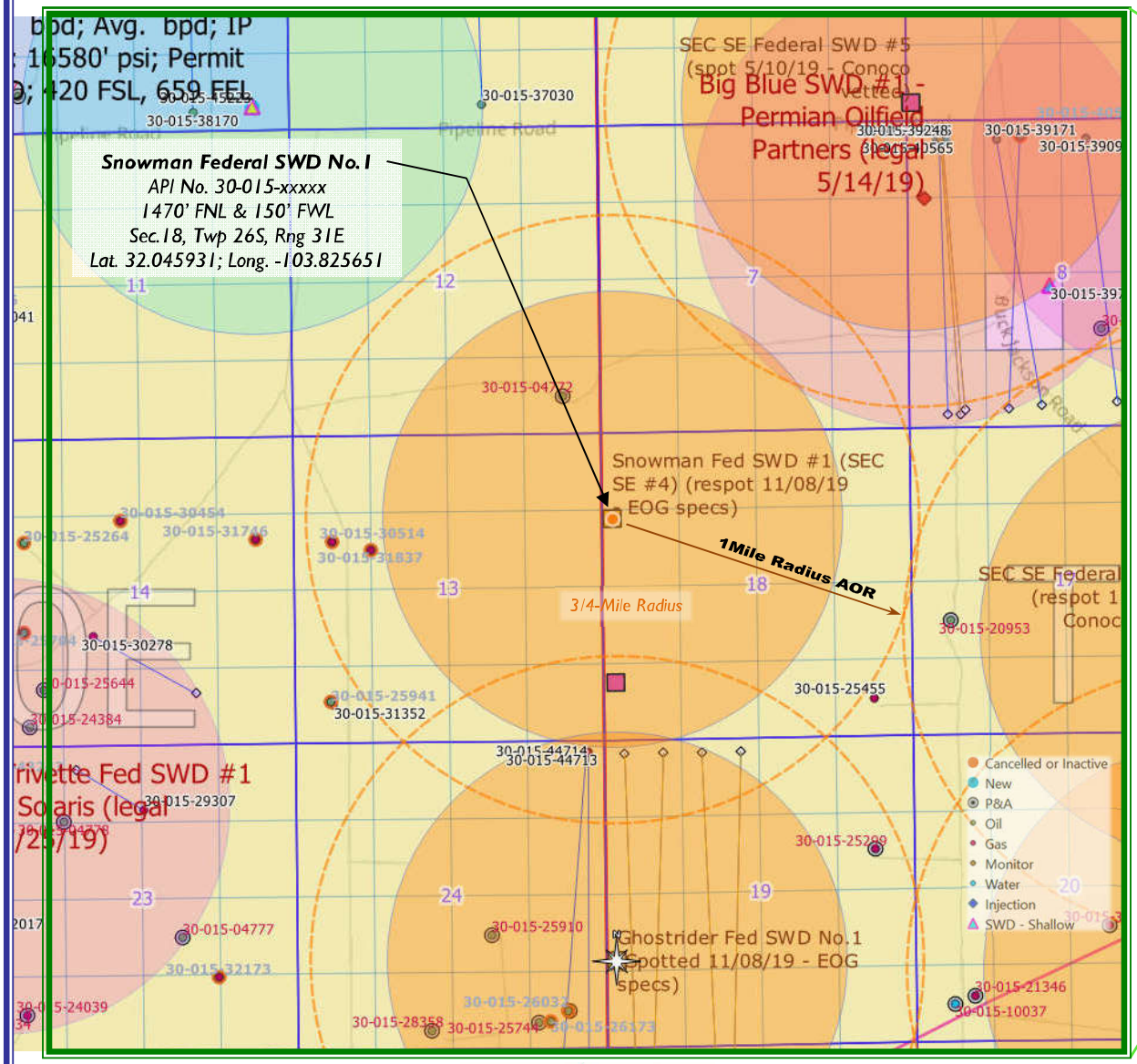
Snowman Federal SWD No.1 - Area of Review / 2 Miles

(Attachment to NMOCD Form C-108 - Item V)

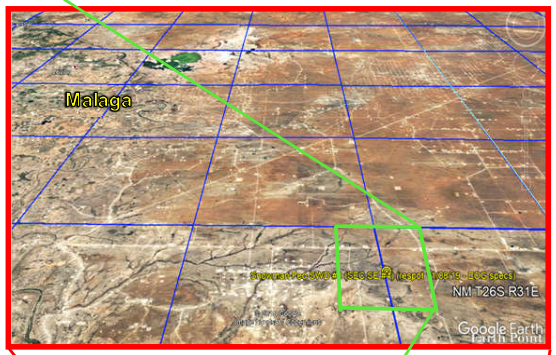


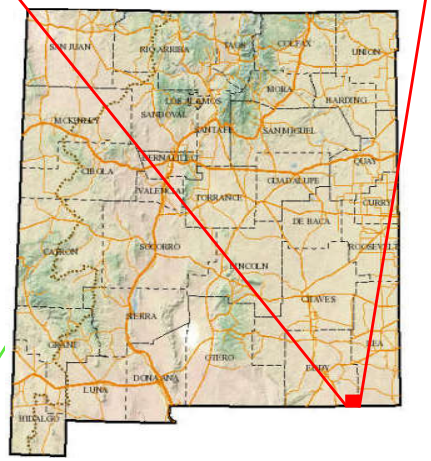
Snowman Federal SWD Well No.1 – One Mile Area of Review / Overview Map

(Attachment to NMOCD Form C-108, Application for Authority to Inject.)



19.3 miles Southeast of Malaga, NM





Eddy County, New Mexico

TROVE Energy & Water

SOS Consulting, LLC

C-108 ITEM X

LOGS and AVAILABLE TEST DATA

A Standard Suite of Logs will be run after drilling the well and submitted to the Division.

C-108 ITEM VII – PROPOSED OPERATION

Trove Snowman Federal SWD #1

COMMERCIAL SWD FACILITY

Upon approval of all permits for SWD, operations would begin within 30 days. Completion of the well operations will take approximately 6-8 weeks. Facility construction including installation of the tank battery, berms, plumbing and other and associated equipment would be occurring during the same interval but at a different location from the well. In any event, it is not expected for the facility construction phase of the project to last more than 60 days, depending on availability of contractors and equipment. Facility design is currently in the planning phase with a company which specializes in such construction.

DRILL AND CONFIGURE FOR SALT WATER DISPOSAL

Interval Determination

Prior to commencing disposal, Trove Energy and Water shall submit mudlog and geophysical logs information, to the Division's District geologist and Santa Fe Engineering Bureau, showing evidence agreeable that only the permitted formation is open for disposal including a summary of depths (picks)for contacts of the formations which the Division shall use to amend any order for a final description of the depth for the injection interval. If significant hydrocarbon shows occur while drilling, the operator shall notify Artesia district office and Trove will seek written permission prior to commencing disposal.

Casing and Logging

Trove's design is to circulate all casing strings to surface. If cement does not circulate on any casing string, the Trove will run a cement bond log (CBL) or other log to determine top of cement and shall notify the Artesia district office with the top of cement (emergency phone number if after normal business hours) prior to continuing with any further cement activity with the proposed well. If cement does not tie back in to next higher casing shoe, the operator shall perform remedial cement job(s) to bring cement, at a minimum, 200 feet above the next higher casing shoe. The operator shall run a CBL (or equivalent) for the 7-5/8-inch liner to demonstrate placement cement and the cement bond with the tie-in with 9-5/8-inch casing string. All logs on the well will be copied to the Artesia district office; CBL logs and mudlogs will be provided prior to commencing disposal. Additionally, prior to commencing disposal the operator shall obtain a bottom-hole pressure of the open-hole completion. This information shall be provided with the sundry notice of commencement of disposal operations.

Monitoring and Reporting

Prior to commencing any work, an NOI sundry(ies) will be submitted to configure the well for SWD and will detail the completion workover including all work otherwise described above, any change to the procedure noted herein and to perform mechanical integrity pressure test per OCD test procedures. (Notify NMOCD 24 hours prior.) The casing/tubing annulus will be monitored for communication with injection fluid or loss of casing integrity.

C-108 ITEM VII – PROPOSED OPERATION

(continued)

OPERATIONAL SUMMARY

The SWD facility will not be fenced so that trucks may access for load disposal 24/7.

Ultimately, Trove's plans would include tying the SWD into a pipeline, when and if available, so the well and injection equipment will be a closed system and equipped with pressure limiting devices and volume meters. The annulus, loaded with an inert, anti-corrosion packer fluid, will be monitored for pressure.

SCADA System

The facility and tanks will be equipped with telemetry devices and visual alarms to alert the operator and customers of full tanks or an overflow situation. Operational details including rates, pressures, valve, tank and levels will be continually monitored and either controlled remotely or personnel dispatched for further action.

In addition to operational SCADA system control and monitoring, Trove is considering installing RS Pro Lateral & Vertical Earthquake Monitors with Accelerometer, or better for continuous monitoring. Data will be remotely accessible; monitored and shared as needed. An alternative solution being considered would employ a third party to provide seismic monitoring using public and private seismometers as available.

Rates, Pressures, Releases

Anticipated daily maximum volume is 40,000 bpd and an average of 30,000 bpd at a maximum surface injection pressure of 3320 psi (.2 psi/ft gradient) – maximum pressure will be adjusted If the top of interval is modified after well logs are run.

Potential releases will be contained and cleaned up immediately. The operator shall repair or otherwise correct the situation within 48 hours before resuming operations. OCD will be notified within 24 hours of any release greater than 5 bbls. If required, remediation will start as soon as practicable. Operator shall comply with 19.15.29 NMAC and 19.15.30 NMAC; as necessary and appropriate and OCD form C-141 will be submitted promptly.

C-108 ITEM VII – PRODUCED WATER ANAYLSES

Item VII.4 – Water Analysis of Source Zone Water

Delaware
Bone Spring
Wolfcamp

Item VII.5 – Water Analysis of Disposal Zone Water

Devonian

Water Analyses follow this page.

C-108 Item VII.5 - Produced Water Data

Trove Energy & Water, LLC - SEC SE Federal Project Area

SOURCE ZONE

DELAWARE

Lab ID

Sample ID 5532

Sample No

API No 3001510181

Well Name SUPERIOR STATE 002

Location ULSTR 08 25 S 30 E **Lat / Long** 32.14281 -103.89616

1980 S 660 E **County** Eddy

Operator (when sampled)

Field CORRAL CANYON Unit I

Sample Date Analysis Date

Sample Source SWAB Depth (if known)

Water Typ

ph		alkalinity_as_caco3_mgL	
ph_temp_F		hardness_as_caco3_mgL	
specificgravity		hardness_mgL	
specificgravity_temp_F		resistivity_ohm_cm	
tds_mgL	155173	resistivity_ohm_cm_temp	
tds_mgL_180C		conductivity	
chloride_mgL	92820	conductivity_temp_F	
sodium_mgL		carbonate_mgL	
calcium_mgL		bicarbonate_mgL	122
iron_mgL		sulfate_mgL	133
barium_mgL		hydroxide_mgL	
magnesium_mgL		h2s_mgL	
potassium_mgL		co2_mgL	
strontium_mgL		o2_mgL	
manganese_mgL		anionremarks	

Remarks

(Produced water data courtesy of NMT Octane NM WAIDS database.)

SOS Consulting, LLC

C-108 Item VII.5 - Produced Water Data

Trove Energy & Water, LLC - SEC SE Federal Project Area

SOURCE ZONE

BONE SPRING

Lab ID

Sample ID 6681

Sample No

API No 3002533529

Well Name THYME APY FEDERAL 002

Location ULSTR 01 23 S 32 E **Lat / Long** 32.33657 -103.62470

1650 N 1650 E **County** Lea

Operator (when sampled)

Field RED TANK Unit G

Sample Date 11/27/2001 Analysis Date

Sample Source

Water Typ

Depth (if known)

ph	6.1	alkalinity_as_caco3_mgL	
ph_temp_F		hardness_as_caco3_mgL	
specificgravity	1.15	hardness_mgL	
specificgravity_temp_F		resistivity_ohm_cm	
tds_mgL	172896	resistivity_ohm_cm_temp	
tds_mgL_180C		conductivity	
chloride_mgL	104976	conductivity_temp_F	
sodium_mgL		carbonate_mgL	
calcium_mgL	0	bicarbonate_mgL	781
iron_mgL	0	sulfate_mgL	1150
barium_mgL	0	hydroxide_mgL	
magnesium_mgL	2025	h2s_mgL	0
potassium_mgL		co2_mgL	
strontium_mgL		o2_mgL	
manganese_mgL		anionremarks	

Remarks

(Produced water data courtesy of NMT Octane NM WAIDS database.)

SOS Consulting, LLC

C-108 Item VII.5 - Produced Water Data

Trove Energy & Water, LLC - SEC SE Federal Project Area

SOURCE ZONE

WOLFCAMP

Lab ID

Sample ID 5096

Sample No

API No 3002501678

Well Name LAGUNA PLATA FEDERAL UNIT 001

Location ULSTR 22 19 S 33 E **Lat / Long** 32.64341 -103.64461

1980 S 710 E **County** Lea

Operator (when sampled)

Field TONTO Unit I

Sample Date Analysis Date

Sample Source DST Depth (if known)

Water Typ

ph		alkalinity_as_caco3_mgL	
ph_temp_F		hardness_as_caco3_mgL	
specificgravity		hardness_mgL	
specificgravity_temp_F		resistivity_ohm_cm	
tds_mgL	46915	resistivity_ohm_cm_temp	
tds_mgL_180C		conductivity	
chloride_mgL	27270	conductivity_temp_F	
sodium_mgL		carbonate_mgL	
calcium_mgL		bicarbonate_mgL	714
iron_mgL		sulfate_mgL	1116
barium_mgL		hydroxide_mgL	
magnesium_mgL		h2s_mgL	
potassium_mgL		co2_mgL	
strontium_mgL		o2_mgL	
manganese_mgL		anionremarks	

Remarks

(Produced water data courtesy of NMT Octane NM WAIDS database.)

SOS Consulting, LLC

C-108 Item VII.5 - Produced Water Data

Trove Energy & Water, LLC - SEC SE Federal Project Area

DISPOSAL ZONE

DEVONIAN

Lab ID

Sample ID 5720

Sample No

API No 3002521082

Well Name ANTELOPE RIDGE UNIT 003

Location ULSTR 34 23 S 34 E **Lat / Long** 32.25922 -103.46068

1980 S 1650 W **County** Lea

Operator (when sampled)

Field ANTELOPE RIDGE Unit K

Sample Date 11/14/1967 Analysis Date

Sample Source UNKNOWN Depth (if known)

Water Typ

ph	6.9	alkalinity_as_caco3_mgL	
ph_temp_F		hardness_as_caco3_mgL	
specificgravity		hardness_mgL	
specificgravity_temp_F		resistivity_ohm_cm	
tds_mgL	80187	resistivity_ohm_cm_temp_	
tds_mgL_180C		conductivity	
chloride_mgL	47900	conductivity_temp_F	
sodium_mgL		carbonate_mgL	
calcium_mgL		bicarbonate_mgL	476
iron_mgL		sulfate_mgL	900
barium_mgL		hydroxide_mgL	
magnesium_mgL		h2s_mgL	
potassium_mgL		co2_mgL	
strontium_mgL		o2_mgL	
manganese_mgL		anionremarks	

Remarks

(Produced water data courtesy of NMT Octane NM WAIDS database.)

SOS Consulting, LLC

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Geologic Information

The Devonian and Silurian consist of carbonates including light colored dolomite and chert intervals interspersed with some tight limestone intervals. Several thick sections of porous dolomite capable of taking water are believed present within the subject formations in the area. Depth control data was inferred from deep wells in the area and charted contours. If the base of Devonian and top of Silurian rocks come in as expected the well will only be drilled deep enough for adequate logging rathole.

At a proposed depth of 18,500' BGL (Below Ground Level) the well will TD approximately 1,900' below the estimated top of the Devonian. Mud logging through the interval will ensure the target interval remains in Devonian and Silurian. Once Devonian is determined, the casing shoe depth will be set at an approximate maximum upper depth of 16,600' BGL. Injection will occur through the resulting openhole interval.

TROVE ATTEMPTS TO BRACKET POTENTIAL INJECTION INTERVALS BASED ON OFFSETTING WELLS, AVAILABLE NEARBY LOGS AND CONTOURS PLOTS; IT IS EXPECTED THAT ONCE DRILLING COMMENCES AND MUDLOGGING RETURNS ARE EVALUATED, THE INTERVAL MAY BE ADJUSTED ACCORDINGLY TO EXPLOIT THE DESIRED FORMATION AS DESCRIBED. C-103 SUNDRY REPORTS WITH APPROPRIATE DATA WILL BE FILED WITH THE OCD AND FINALIZED WITH THE C-105 COMPLETION REPORT.

The Devonian is overlain by the Woodford Shale and Mississippian Lime and underlain by the Middle and Lower Ordovician; Simpson, McKee and Ellenburger.

The SWD prospect is in the Carlsbad Basin. Fresh water in the area is generally available from the Rustler and Santa Rosa formations. State Engineer's records show water wells in the area with a depth to groundwater of 292 to 365 feet and an average depth of 317 feet.

There is 1 (one) water well located within one mile of the proposed SWD. Representative analyses from the area are included herein and the subjec wells will be sampled, analyzed and submitted to the division.

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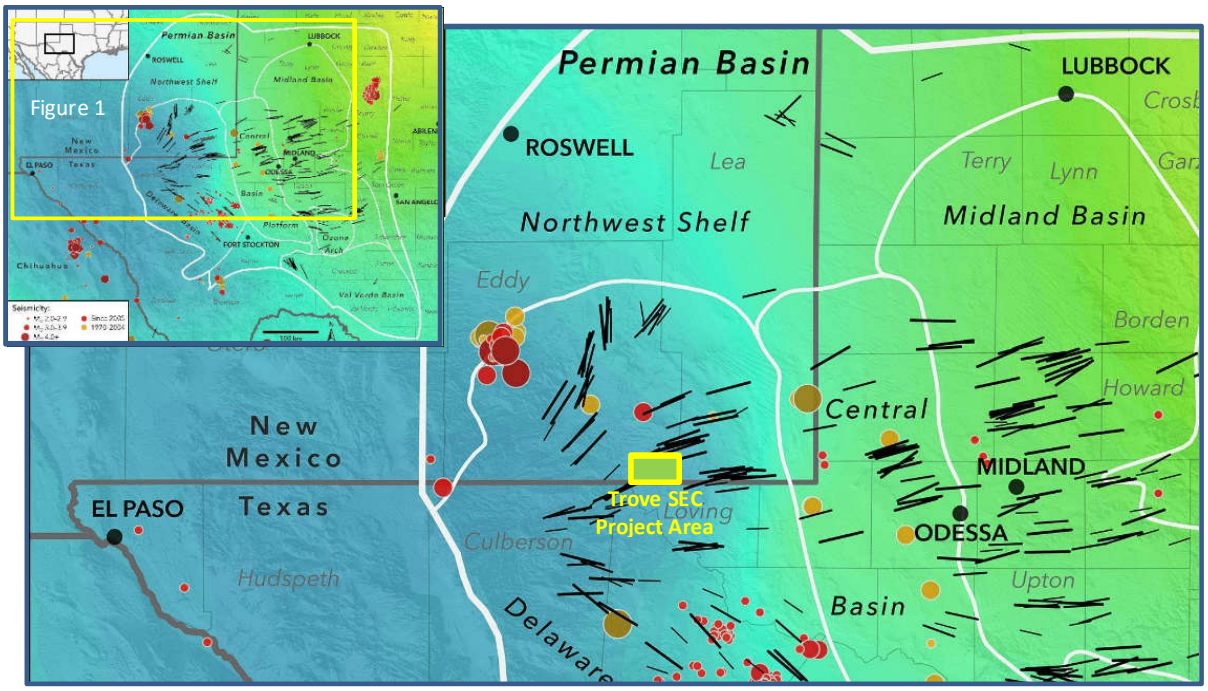
Geological Data

EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT

Map Source: State of stress in the Permian Basin, Texas and New Mexico: Implications for induced seismicity (Figure 1); Jens-Erik Lund Snee/ Mark Zoback, February 2018



TROVE PSE PROJECT VICINITY

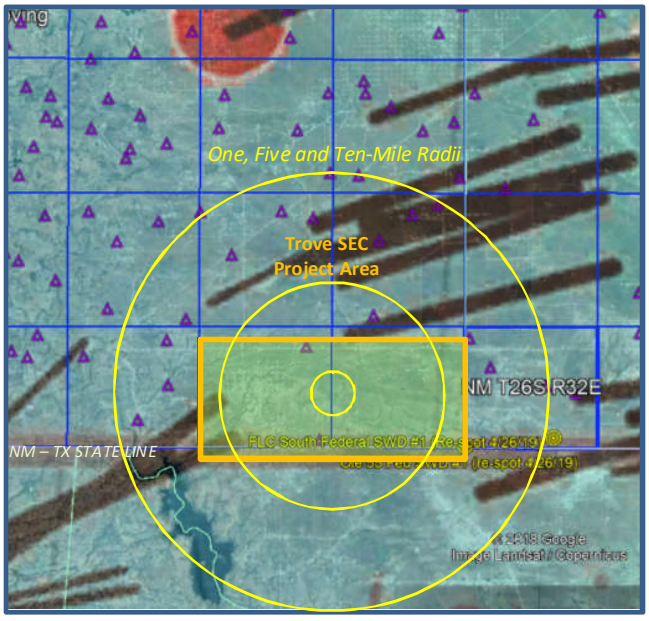


Figure 1. State of stress in the Permian Basin, Texas and New Mexico. Black lines are the measured orientations of the maximum horizontal stress (SHmax), with line length scaled by data quality. The colored background is an interpolation of measured relative principal stress magnitudes (faulting regime) expressed using the Aφ parameter (see text for details) of Simpson (1997). Blue lines are fault traces known to have experienced normal-sense offset within the past 1.6 Ma, from the USGS Quaternary Faults and Folds Database (Crone and Wheeler, 2000). The boundary between the Shawnee and Mazatzal basement domains is from Lund et al. (2015), and the Precambrian Grenville Front is from Thomas (2006). The Permian Basin boundary is from the U.S. Energy Information Administration, and the subbasin boundaries are from the Texas Bureau of Economic Geology Permian Basin Geological Synthesis Project. Earthquakes are from the USGS National Earthquake Information Center, the TexNet Seismic Monitoring Program, and Gan and Frohlich (2013). Focal mechanisms are from Saint Louis University (Herrmann et al., 2011).

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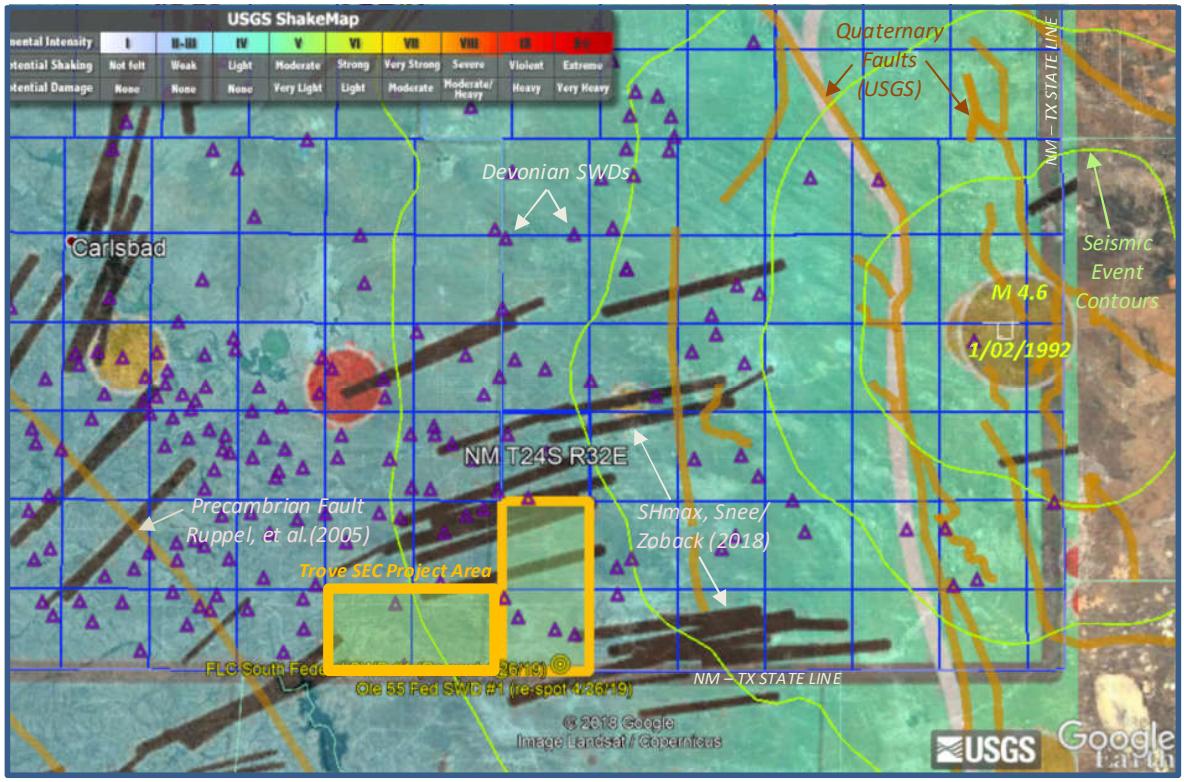
Geological Data

EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)

In the following map, a layer with USGS historical earthquake data is overlaid and, a layer showing lines to represent Precambrian faults as documented by Ruppel, et al. (2005). Finally, a layer showing all currently permitted SWDs completed or proposed to be completed in the Devonian (Silurian) formation.

The USGS earthquakes shown are well known to the area. The 2012 quake located approximately 13 miles due east of Loving is also shown (19.2 miles). This was perhaps the most significant of the area in recent years but was determined to not be related to oil and gas activity. The best known and largest in recent history was the 1992, 4.6 magnitude quake centered south of Eunice, NM (36.0 miles).

The Precambrian faults and existing Devonian SWDs are discussed in more detail on the next page.



REGIONAL VIEW - DEVONIAN SWD LOCATIONS, PRECAMBRIAN FAULTS, S_{Hmax}, USGS MAGNITUDE

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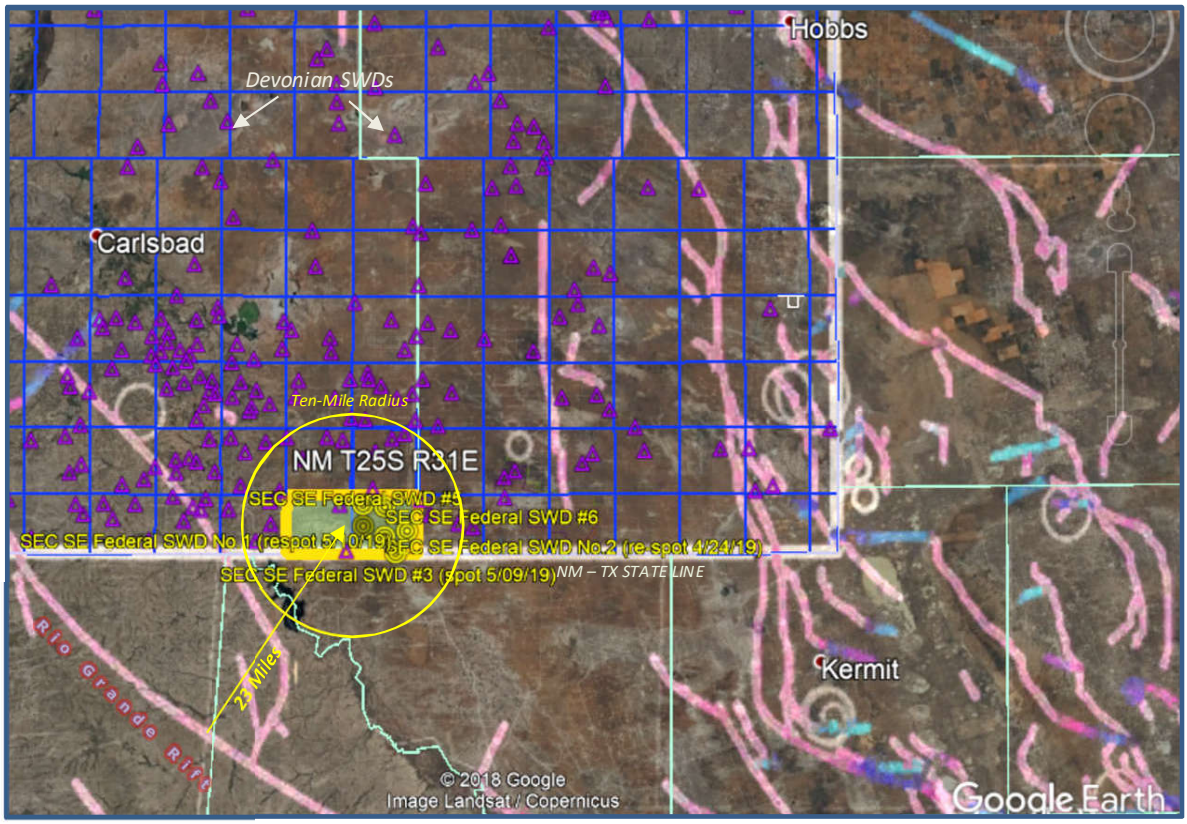
Geological Data

EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)

The primary Precambrian faults in the area as documented by Ruppel, et al. (2005) is represented on this map by the thick, pink colored lines. The most significant of these is the fault associated with the Rio Grande Rift, running southeast to northwest and, runs adjacent to a portion of Hwy 285; a portion the associated fault which runs parallel approximately 15 miles northeast is also depicted below. The Trove SEC Project SWD Area is located some 23 miles from the fault. Other documented faults (USGS, 2000) are shown for eastern Lea County and extending into west Texas. Other Devonian SWDs in the area are also shown (small purple triangles) completed or proposed to be completed in the Devonian (Silurian) formation.

The previously referenced study by Snee and Zoback (shown on previous exhibits) evaluated the strike-slip probability using probabilistic FSP (Fault Slip Potential) analysis of known faults in the Permian Basin. The study predicts that the Precambrian fault shown here has less than a 10% probability of being critically stressed to the point of creating an induced seismicity event. The main reason for the low probability is due to the relationship of the strike of the fault to the regional S_{Hmax} orientation; the proposed SWD being well removed from the area.



VICINITY - PERMITTED DEVONIAN SWDS, COMPOSITE FAULTS

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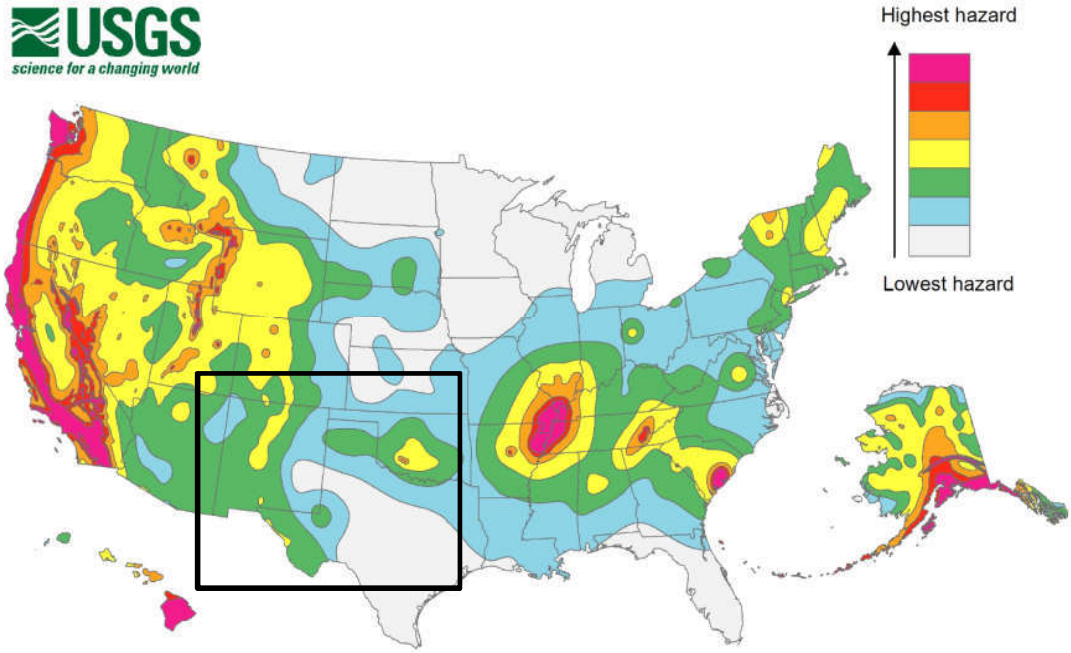
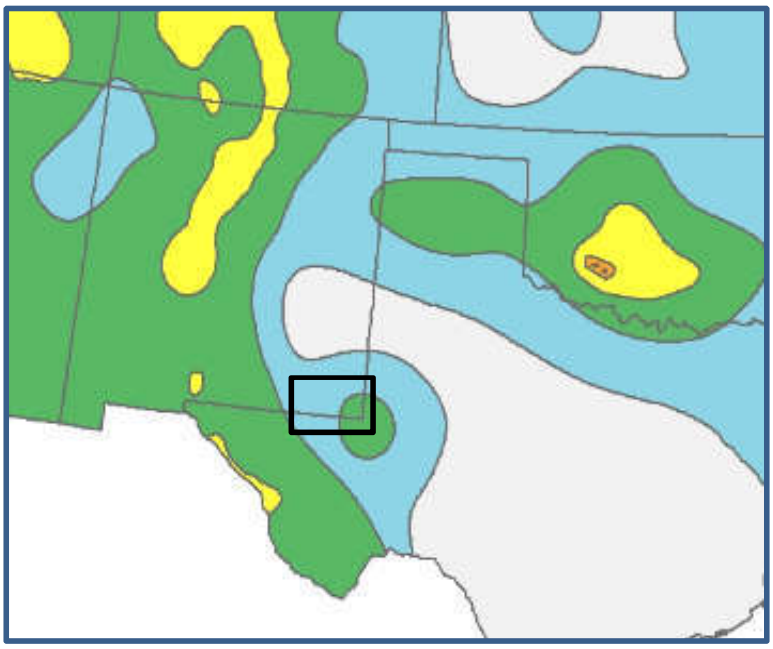
Geological Data

EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)



2014 map data: The USGS notes in its report that fracking may be to blame for a sizeable uptick in earthquakes in places like Oklahoma. "Some states have experienced increased seismicity in the past few years that may be associated with human activities such as the disposal of wastewater in deep wells," the report says. USGS hopes to use that data in future maps but it isn't included in this one. "Injection-induced earthquakes are challenging to incorporate into hazard models because they may not behave like natural earthquakes and their rates change based on man-made activities," the report says.



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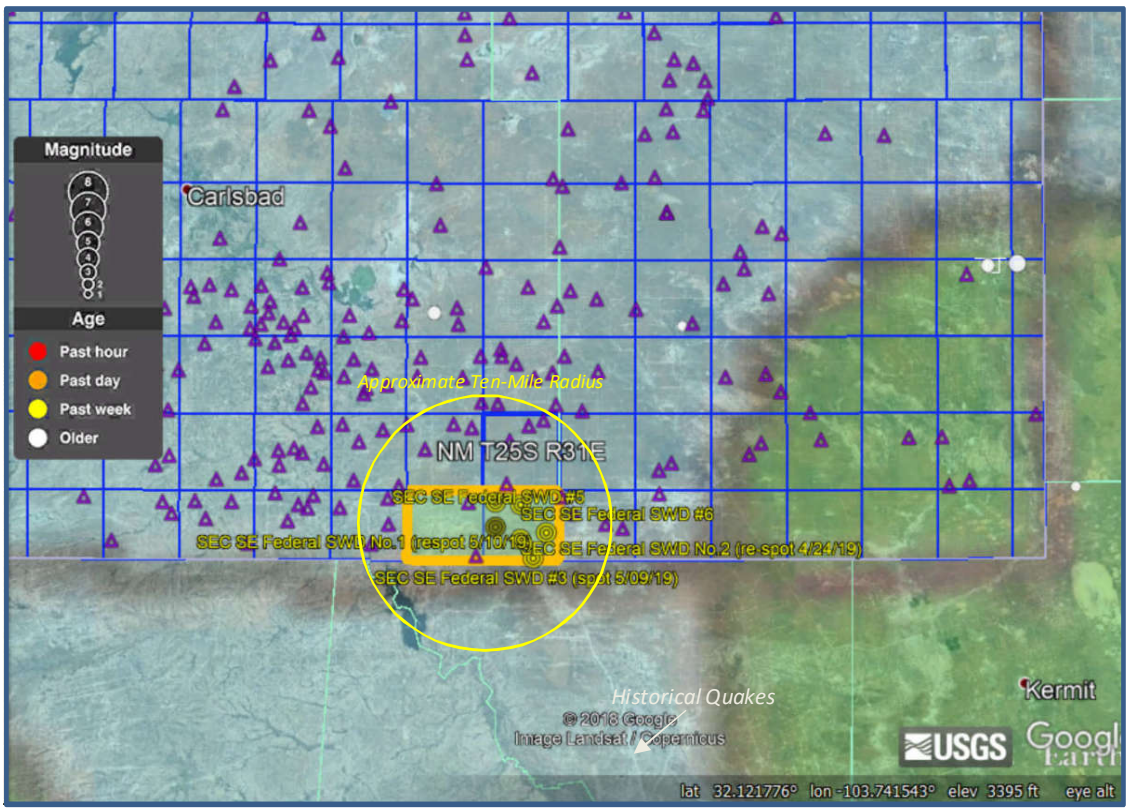
Geological Data

EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)

USGS 2014 REGIONAL MAP DATA OVERLAY IN GOOGLE EARTH W/ HISTORICAL EARTHQUAKES



An updated USGS map for 2018 is on the next page. While methodology remained essentially the same according to USGS, the interpreted results and color-coding did have some modification. However, the subject area in southeast New Mexico on both maps remains very low and on the 2018 map, the area is assigned a value of <1% of "potentially minor-damage ground shaking".

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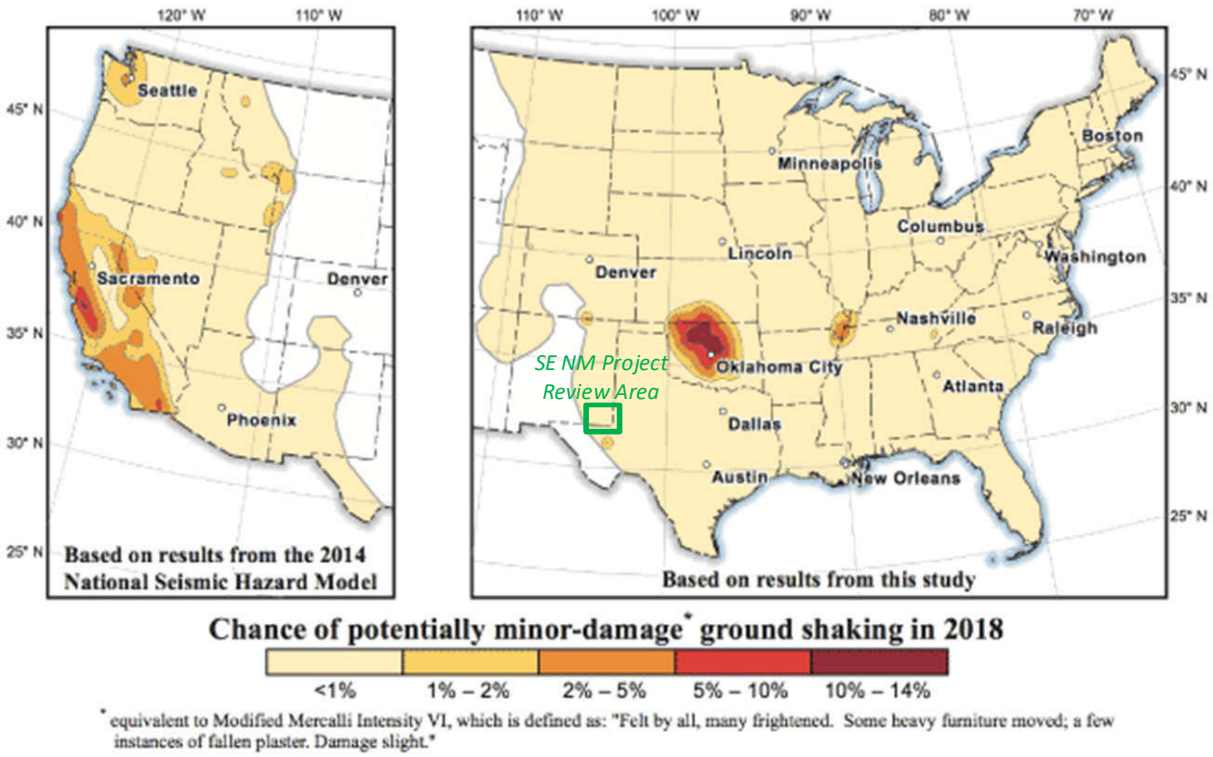
Geological Data

EARTHQUAKE / SEISMIC INFORMATION SUPPLEMENT (cont.)

USGS 2018 ONE-YEAR MODEL



Map showing chance of damage from an earthquake in the Central and Eastern United States during 2018. Percent chances are represented as follows: pale yellow, less than 1 percent; dark yellow, 1 to 2 percent; orange, 2 to 5 percent; red, 5 to 10 percent; dark red, 10 to 12 percent. See Hazard from the western United States from the 2014 National Seismic Hazard Maps (Petersen et al., 2014) for comparison.

The USGS has produced the 2018 one-year probabilistic seismic hazard forecast for the central and eastern United States from induced and natural earthquakes. For consistency, the updated 2018 forecast is developed using the same probabilistic seismicity-based methodology as applied in the two previous forecasts.

Based on publicly available data for the subject area, it is reasonable to believe the risk of induced seismic activity due to disposal injection into this well is extremely low.

Trove Energy and Water, LLC

Fault Slip Potential Analysis

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FSP Methodology

- 4 FSP areas (100 square miles each) centered on townships in southeast New Mexico to cover all proposed Trove SWDs.
- Exact geologic conditions of the FSP areas are unknown.
- Two scenarios modeled for each FSP area using range of possible geologic conditions based on nearby geophysical logs.
- Scenario 1 uses low end of possible geologic conditions.
- Scenario 2 uses high end of possible geologic conditions.
- Each scenario modeled over 25 years. Stress gradients and pore pressure gradients derived from published papers (Snee and Zoback 2018).
- Reference depth, injection interval thickness, porosity, and permeability derived from nearby geophysical logs penetrating the injection interval (New Mexico OCD 2019, see appendix).
- One mapped Precambrian fault in the 100 square mile area of review for FSP area 1. No mapped or known sedimentary or Precambrian faults in the 100 square mile area of review for FSP areas 2, 3, and 4 (USGS 2019 and Wilson 2018).
- Additional random faults generated using strike and dip consistent with known New Mexico faults (USGS 2019, Snee and Zoback 2018).
- Advanced geological parameters derived from well logs and confirmed with previous expert testimony in the region (Reynolds 2019).

Parameters

Parameter	Value	Source
Vertical Stress Gradient (psi/ft)	1.1	Snee and Zoback (2018)
Horizontal Stress Direction (degrees azimuth)	75	Snee and Zoback (2018)
Reference Depth (ft)	16,600-17,500	Well Logs NMOCD (2019)
Initial Reservoir Pressure Gradient (psi/ft)	0.44	Snee and Zoback (2018)
A Phi	0.7	Snee and Zoback (2018)
Friction Coefficient	0.7	Snee and Zoback (2018)
Thickness with High Porosity (ft)	100-250	Well Logs NMOCD (2019)
Porosity (%)	5-10	Well Logs NMOCD (2019)
Permeability (mD)	10-100	Well Logs NMOCD (2019)
Fault Strike Minimum (degrees)	140	Snee and Zoback (2018)
Fault Strike Maximum (degrees)	190	Snee and Zoback (2018)
Fault Dip Minimum (degrees)	60	Snee and Zoback (2018)
Fault Dip Maximum (degrees)	90	Snee and Zoback (2018)
Density (kg/m^3)	1000	ALL Research and Reynolds (2019)
Dynamic Viscosity (Pa*s)	0.0003	ALL Research and Reynolds (2019)
Fluid Compressibility (Pa^-1)	4.70E-10	ALL Research and Reynolds (2019)
Rock Compressibility (Pa^-1)	8.70E-10	ALL Research and Reynolds (2019)

Injection Data

- 13 deep class II injection wells active in 2019 within 4 areas of review (see appendix).
- Monthly average injection rates calculated from injection start-date through April 2019 (see appendix).
- 14 proposed Trove SWDs within 4 areas of review.
- Proposed Trove SWDs assumed to inject at proposed average rate of 40,000 bpd.

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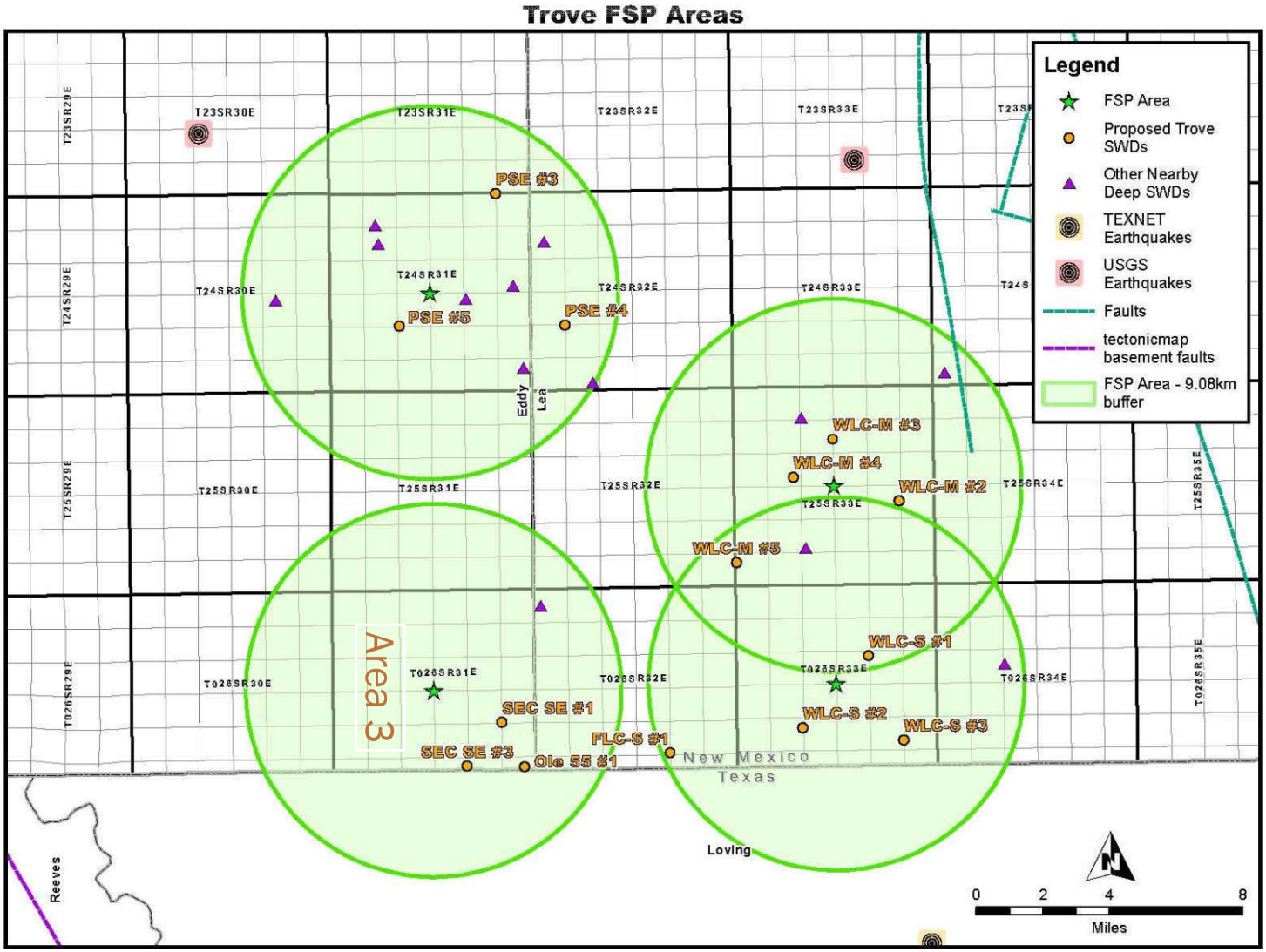
FSP Areas



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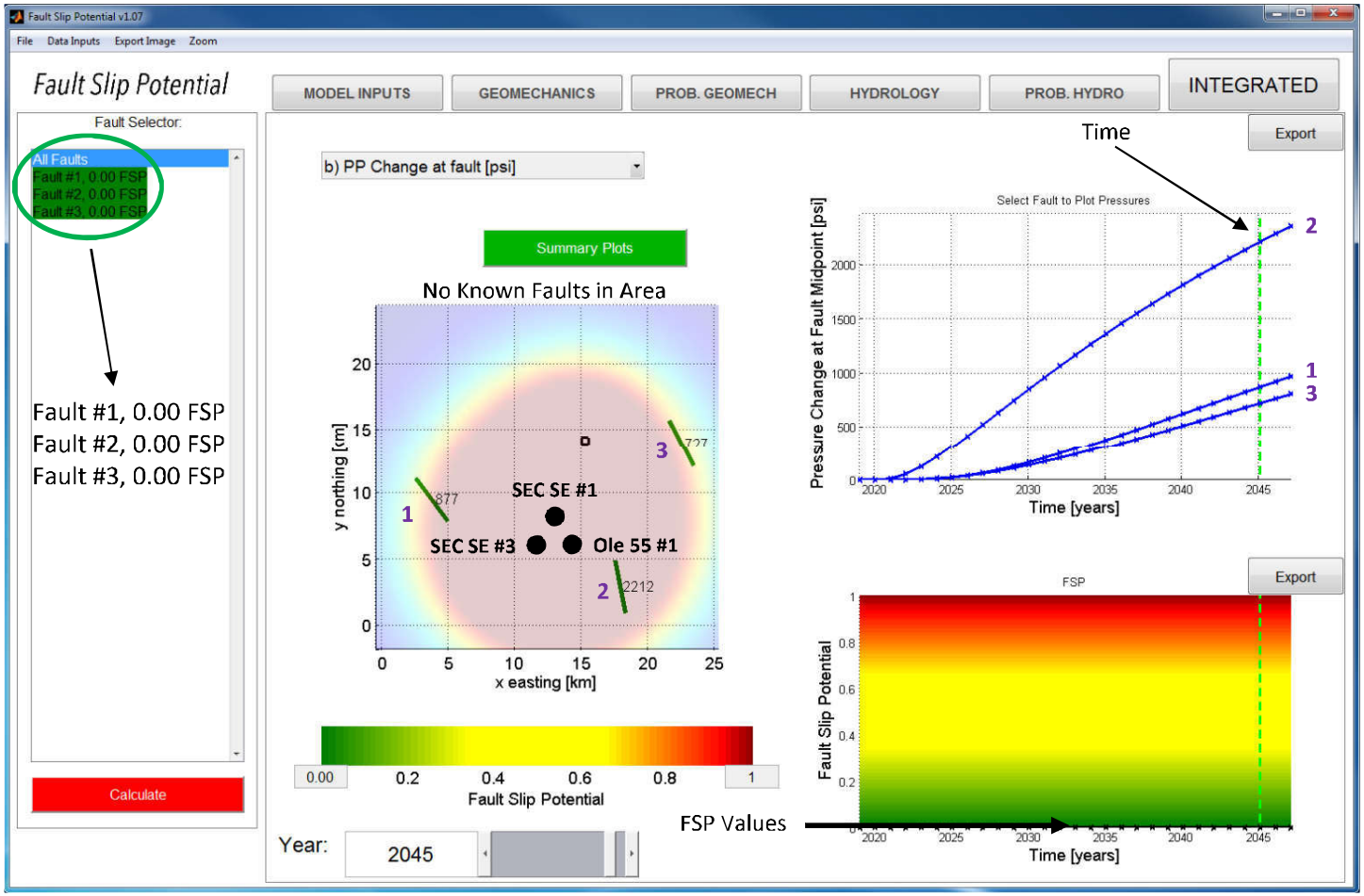
FSP After 25 Years - Area 3 - Scenario 1



Parameters

Estimated Porosity
5%

Estimated Permeability
10 mD

Estimated Injection Interval
16,600 – 18,500 ft

Estimated Thickness with High (5%) Porosity
100 ft

● = Proposed Trove SWDs

□ = Other Deep SWDs

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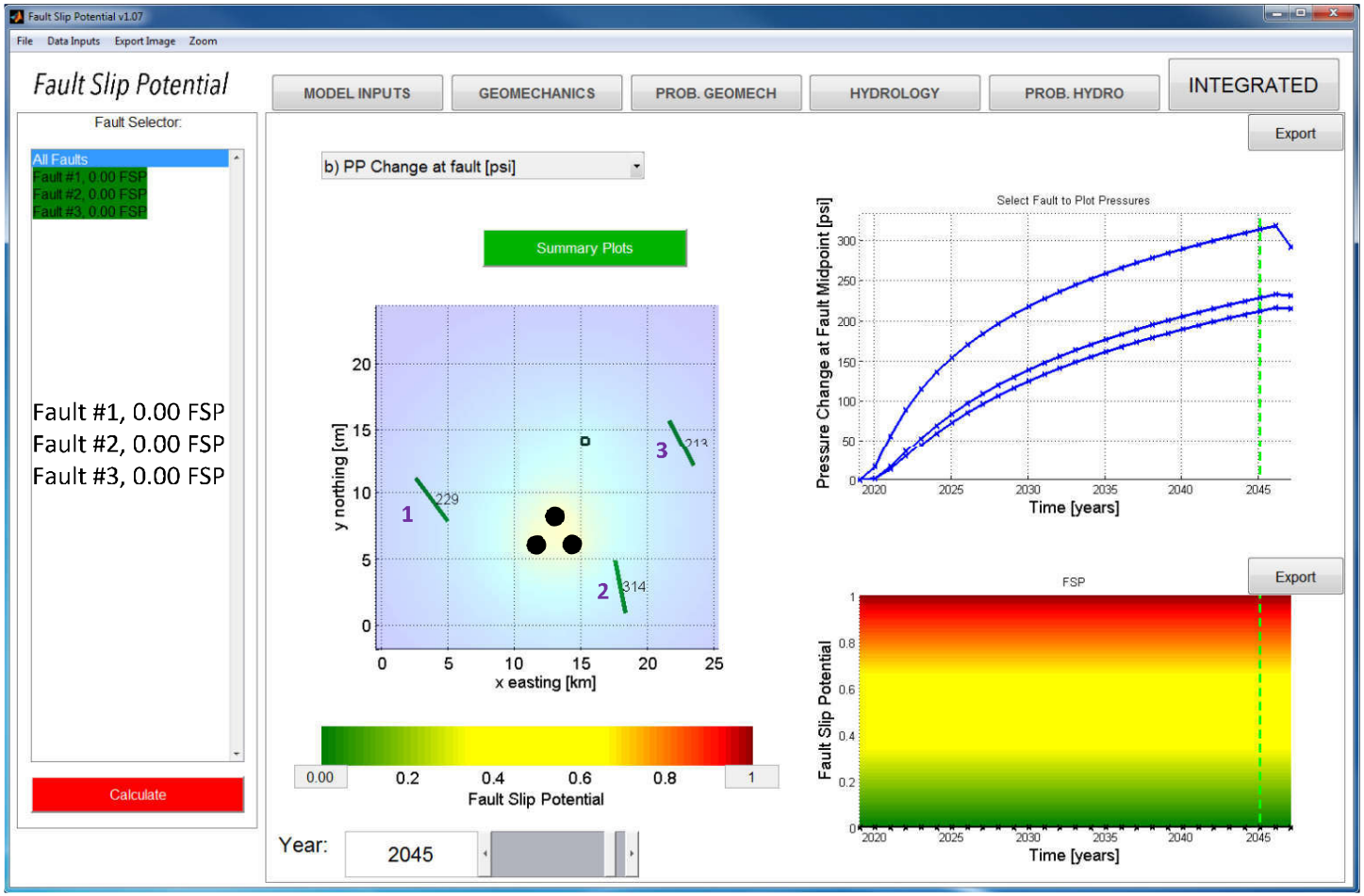
FSP After 25 Years - Area 3 - Scenario 2



Parameters

Estimated Porosity
10%

Estimated Permeability
100 mD

Estimated Injection Interval
16,600 – 18,500 ft

Estimated Thickness with High (10%) Porosity
250 ft

● = Proposed Trove SWDs

□ = Other Deep SWDs

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Conclusions

- There is one mapped Precambrian fault in the 100 square mile review of FSP area 1, which shows FSP of 0.00 over 25 years in both high and low geologic scenarios.
- Known faults in southeast New Mexico do not align with the horizontal stress field, and are not likely to slip.
- FSP modeling through 25 years, with injection rates that are likely overestimated, shows no risk of potential fault slip in the areas of review.
- These areas present little to no risk for injection induced seismicity.

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U.S. Geological Survey. "Faults." https://earthquake.usgs.gov/hazards/qfaults/ (Accessed June 24, 2019)

EMNRD Oil Conservation Division. "Welcome to the New Mexico Mining & Minerals Division." http://www.emnrd.state.nm.us/OCD/ocdonline.html (Accessed July 19, 2019)

Snee, Jens-Erik Lund, and Mark D. Zoback. 2018. "State of Stress in the Permian Basin, Texas and New Mexico: Implications for Induced Seismicity." *The Leading Edge* 37, no. 2 (February 2018): 127-34.

Wilson, Scott J. 2018. "Affidavit of Scott J. Wilson, Amended Applications of NGL Water Solutions Permian, LLC for Approval of Saltwater Disposal Wells in Lea County, New Mexico." New Mexico Oil Conservation Division Case No, 16438 and Case No. 16440.

Reynolds, Todd. 2019. "FSP Analysis (Fault Slip Potential) Exhibits." New Mexico Oil Conservation Division Case No. 20313, Case No. 20314, and Case No. 20472.

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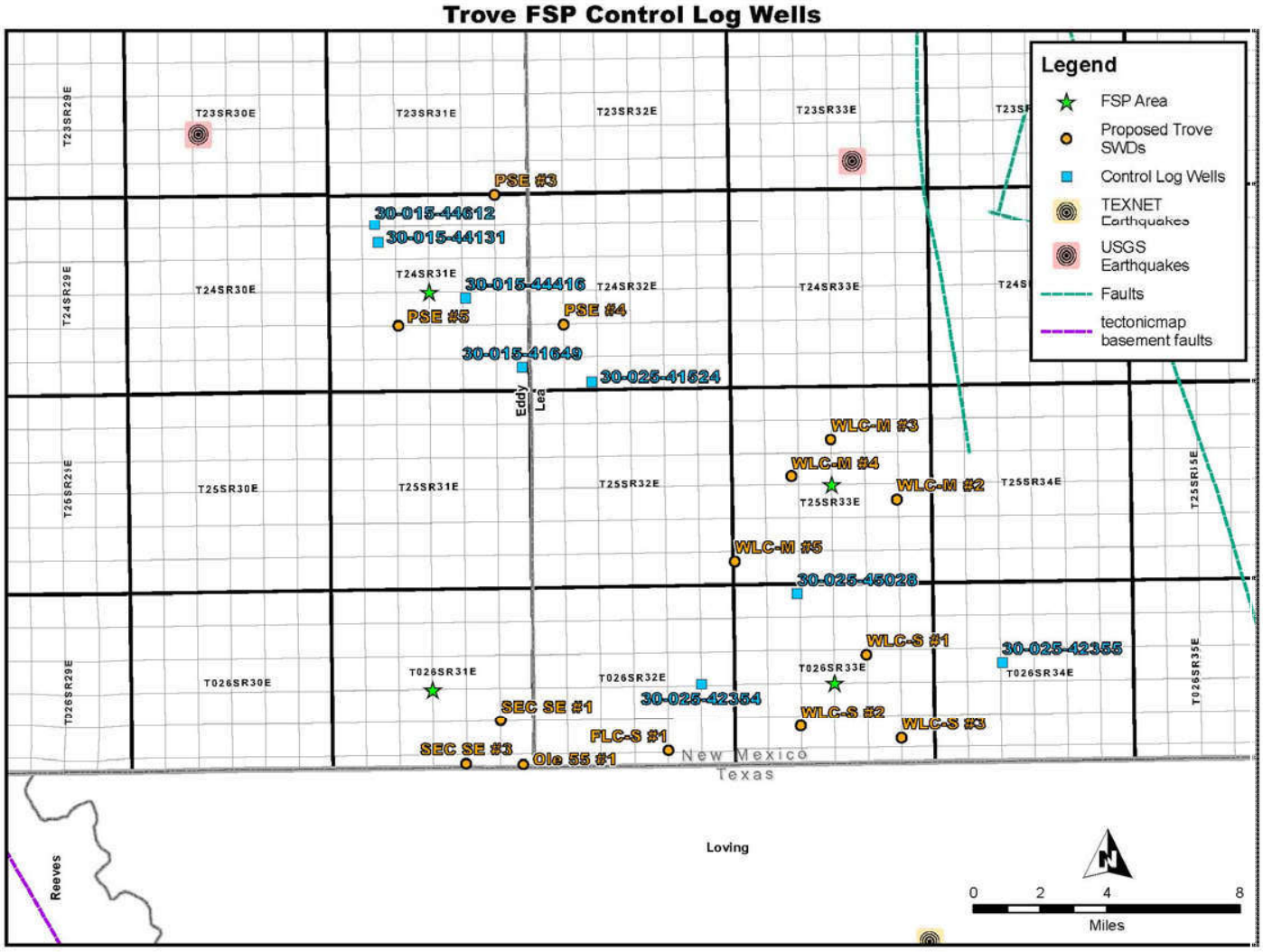
Appendix

Control Log Well Details
and Nearby Deep SWDs Injection Data

Control Log Wells



30-025-45028
Dev/Sil logged from 17,430' to 18,900' (partial)

30-025-42354
Dev/Sil logged from 17,730' to 18,675' (partial)

30-025-42355
Dev/Sil logged from 18,610' to 20,071' (complete)

30-015-41649
Dev/Sil logged from 16,749' to 18,118' (complete)

30-015-44131
Dev/Sil logged from 16,530' to 16,950' (partial)

30-015-44416
Dev/Sil logged from 16,691' to 18,100' (partial)

30-015-44612
Dev/Sil logged from 16,430' to 17,690' (partial)

30-025-41524
Dev/Sil logged from 17,000' to 18,500' (partial)

Notes: Approximately 100-250 feet of >5% porosity within injection interval. Montoya is tight where present on logs.

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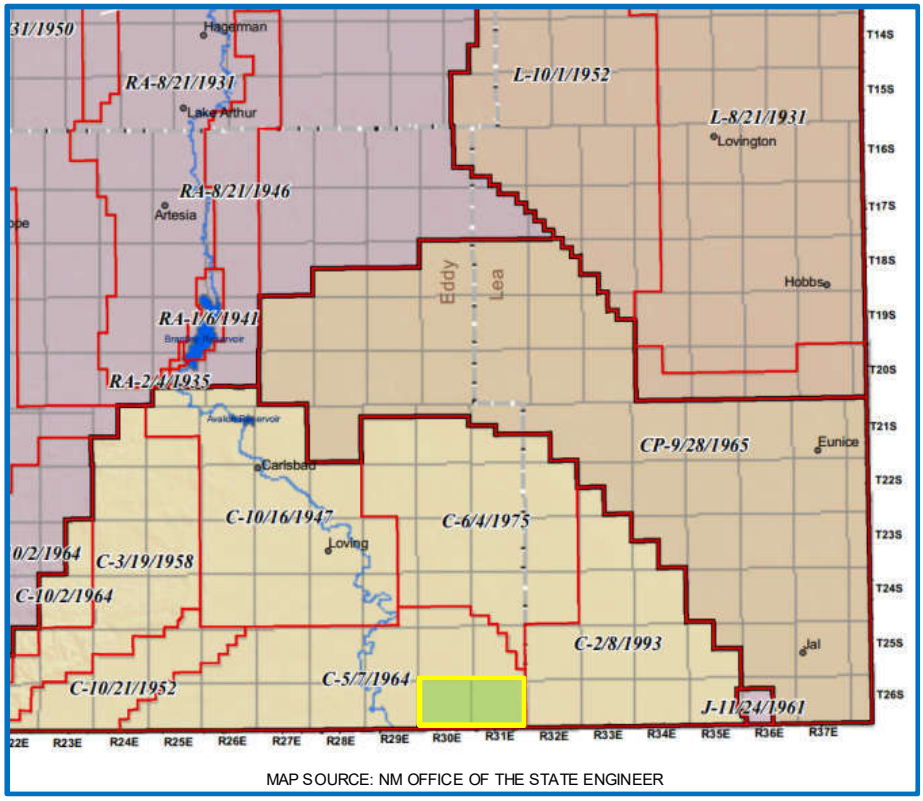
Data Source: New Mexico OCD 2019

Nearby Deep SWD Injection Data

FSP Area	API #	Well Name	Average Daily Injection Rate (BWPD)	Injection Start-Date
1	30-015-43867	CYPRESS SWD #001	8,377	Jul - 2018
1	30-025-29000	DIAMOND 31 FEDERAL COM #001	2,950	Jan - 2014
1, 2	30-025-35598	RED HILLS SWD #001	8,346	Dec - 2018
2	30-025-42355	RATTLESNAKE 16 SWD #001	5,834	Dec - 2015
3	30-025-43379	PADUCA 6 SWD #001Y	21,046	Aug - 2017
4	30-025-41524	COTTON DRAW 32 STATE SWD #002	12,724	Mar - 2017
4	30-015-41649	COTTON DRAW UNIT SWD #181	10,367	Jan - 2014
4	30-015-44676	MESA VERDE SWD #003	8,396	Sep - 2018
4	30-015-40935	PLU DELAWARE B 23 FEDERAL SWD #001	9,742	Jul - 2013
4	30-015-44612	SAND DUNES SWD #001	1,472	Nov - 2018
4	30-015-44131	SAND DUNES SWD #002	17,396	Jul - 2018
4	30-025-43473	STATION SWD #001	25,243	Aug - 2018
4	30-015-44416	STRIKER 2 SWD #001	11,584	Oct - 2018

C-108 - Item XI

Groundwater Basins - Water Column / Depth to Groundwater



MAP SOURCE: NM OFFICE OF THE STATE ENGINEER

The subject well is located within the Carlsbad Basin.

State Engineer's records show water wells in the area with a depth to groundwater of 292 to 365 feet and an average depth of 317 feet.

There are NO water wells located within one mile of the proposed SWD.

SOS Consulting, LLC

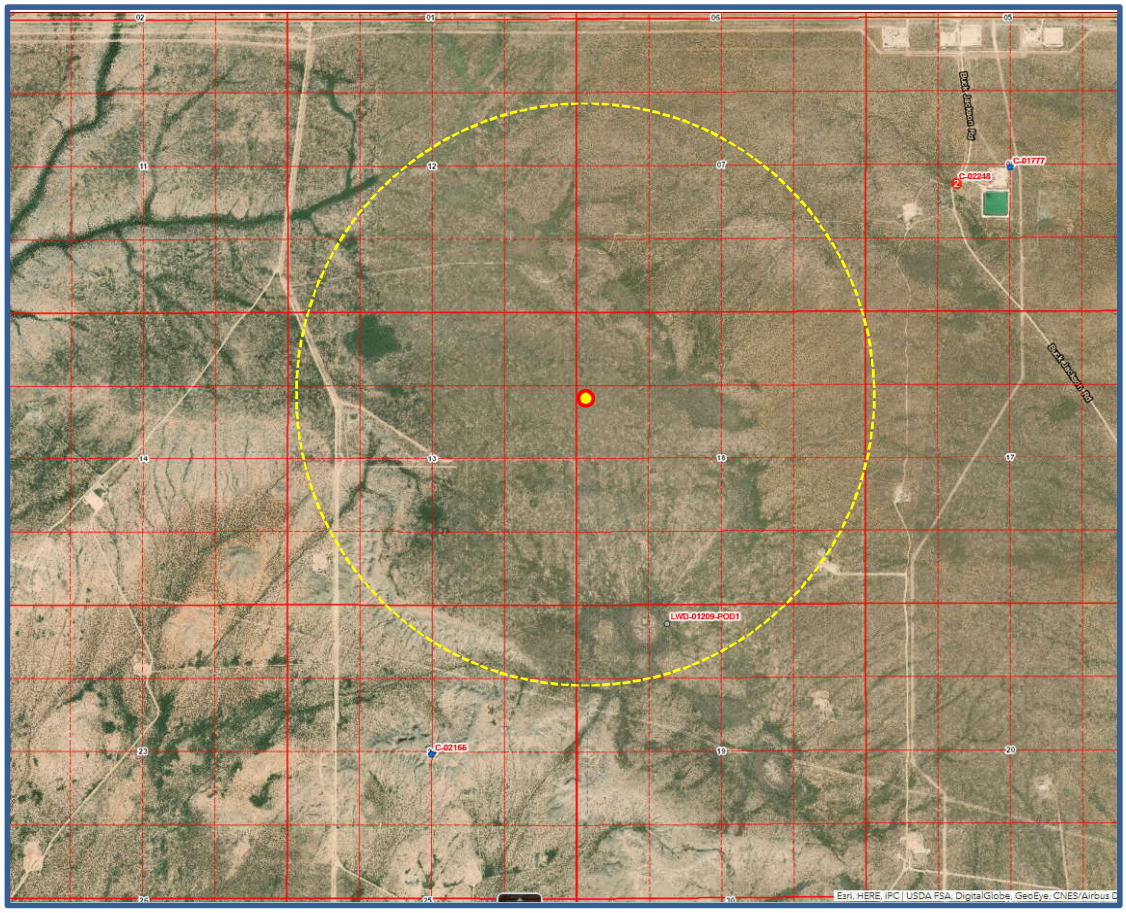
C-108 Item XI

Water Wells Within One Mile

Snowman Federal SWD No.1 - Water Well Locator Map

There is 1 water well (PODs) within a one-mile radius of the proposed SWD.

A representative analysis is included with this application. Samples from subject wells will be analyzed and results submitted to the division.



Data from NM Office of the State Engineer displayed in OSE-GIS System.

SOS Consulting, LLC

C-108 ITEM XI – WATER WELLS IN AOR

Depth to Ground Water

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-basin Code	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
C 01777	C	ED				08	26S	31E	613245	3547409*	325	300	25
C 02090	C	ED		4	4	01	26S	31E	620329	3548533*	350	335	15
C 02248	CUB	ED	1	2	3	08	26S	31E	612942	3547316*	300	292	8
C 02249	CUB	ED	1	2	3	08	26S	31E	612942	3547316*	300	292	8
C 03554 POD1	CUB	ED	2	1	4	01	26S	31E	620547	3549148	630	300	330
C 03639 POD1	CUB	ED	3	4	2	01	26S	31E	620168	3549279	700	365	335
C 04256 POD1	C	ED	4	4	2	01	26S	31E	620384	3549257	666	340	326

Average Depth to Water: **317 feet**
Minimum Depth: **292 feet**
Maximum Depth: **365 feet**

Record Count: 7

PLSS Search:

Township: 26S **Range:** 31E

***UTM location was derived from PLSS - see Help**

P.O. BOX 98
MIDLAND, TX. 79702
PHONE (432) 683-4521

Martin Water Laboratories, Inc.

709 W. INDIANA
MIDLAND, TEXAS 79701
FAX (432) 682-8819

RESULT OF WATER ANALYSES

LABORATORY NO. 112-156
SAMPLE RECEIVED 1-12-12
RESULTS REPORTED 1-19-12

TO: Mike Lamothe
PO Box 1656, Monahans, TX 79756

COMPANY Monachem, Inc. LEASE EOG
FIELD OR POOL
SECTION ____ BLOCK ____ SURVEY 8-26S-31E COUNTY ~~Lea~~ Eddy STATE NM
SOURCE OF SAMPLE AND DATE TAKEN:
NO. 1 Ross Draw water supply well - Sample #1. 1-10-12
NO. 2 Ross Draw water supply well - Sample #2. 1-10-12
NO. 3
NO. 4
REMARKS:

CHEMICAL AND PHYSICAL PROPERTIES	NO. 1	NO. 2	NO. 3	NO. 4
Specific Gravity at 60° F.	1.0025	1.0025		
pH When Sampled				
pH When Received	8.30	8.30		
Bicarbonate as HCO_3	176	171		
Supersaturation as $CaCO_3$				
Undersaturation as $CaCO_3$				
Total Hardness as $CaCO_3$	172	204		
Calcium as Ca	59	53		
Magnesium as Mg	6	17		
Sodium and/or Potassium	42	33		
Sulfate as SO_4	85	102		
Chloride as Cl	21	21		
Iron as Fe	0.2	0.3		
Barium as Ba	0	0		
Turbidity, Electric				
Color as Pt				
Total Solids, Calculated	389	397		
Temperature °F.				
Carbon Dioxide, Calculated				
Dissolved Oxygen,				
Hydrogen Sulfide	0.0	0.0		
Resistivity, ohms/m at 77° F.	22.900	21.300		
Suspended Oil				
Filtrable Solids as mg/l				
Volume Filtered, ml				

Results Reported As Milligrams Per Liter

Additional Determinations And Remarks: The undersigned certifies the above to be true and correct to the best of his knowledge and belief.

Form No. 3

By Greg Ogden, B.S.

LATHAM PRINTING CO. - 333-1292

Fresh Water Analysis: Baker Ranch Water Well 1-26S-31E

Chlorides: 399 ppm
Total Dissolved Solids: 746 ppm

S-1 ; TWP- 26S ; RGE- 31E

BAKER HUGHES

Water Analysis

Date: 22-Apr-15

2700 West County Road, Hobbs NM 88240
Phone (575) 392-5556 Fax (575) 392-7307

Analyzed For

Company	Well Name	County	State
Mewbourne	Baker #1	Lea	New Mexico

Sample Source	Wellhead	Sample #	1
Formation		Depth	
Specific Gravity	1.000	SG @ 60 °F	1.002
pH	7.35	Sulfides	
Temperature (°F)	70	Reducing Agents	

Cations

Sodium (Calc)	in Mg/L	168	in PPM	168
Calcium	in Mg/L	68	in PPM	68
Magnesium	in Mg/L	29	in PPM	29
Soluable Iron (FE2)	in Mg/L	0.0	in PPM	0

Anions

Chlorides	in Mg/L	400	in PPM	399
Sulfates	in Mg/L	70	in PPM	70
Bicarbonates	in Mg/L	18	in PPM	18
Total Hardness (as CaCO3)	in Mg/L	290	in PPM	289
Total Dissolved Solids (Calc)	in Mg/L	748	in PPM	746
Equivalent NaCl Concentration	in Mg/L	725	in PPM	725

Scaling Tendencies

*Calcium Carbonate Index	935
Below 500,000 Remote / 500,000 - 1,000,000 Possible / Above 1,000,000 Probable	
*Calcium Sulfate (Gyp) Index	4,750
Below 500,000 Remote / 500,000 - 10,000,00 Possible / Above 10,000,000 Probable	

*This Calculation is only an approximation and is only valid before treatment of a well or several hours after treatment

Remarks rw=5.@70f

C-108 ITEM XII

Geologic Affirmation

We have examined available geologic and engineering data and have found no evidence of open faults or other hydrologic connection between the disposal interval and any underground sources of drinking water.

Ben Stone, Partner
SOS Consulting, LLC

Project: Trove Energy and Water, LLC
SEC SE Project Area
Reviewed 4/26/2019

Area Review includes Ghost Rider and Snowman prospects spotted in November 2019...

C-108 ITEM XIII – PROOF OF NOTIFICATION

IDENTIFICATION AND NOTIFICATION OF INTERESTED PARTIES

Exhibits for Section

Affected Parties Map

List of Interested Parties

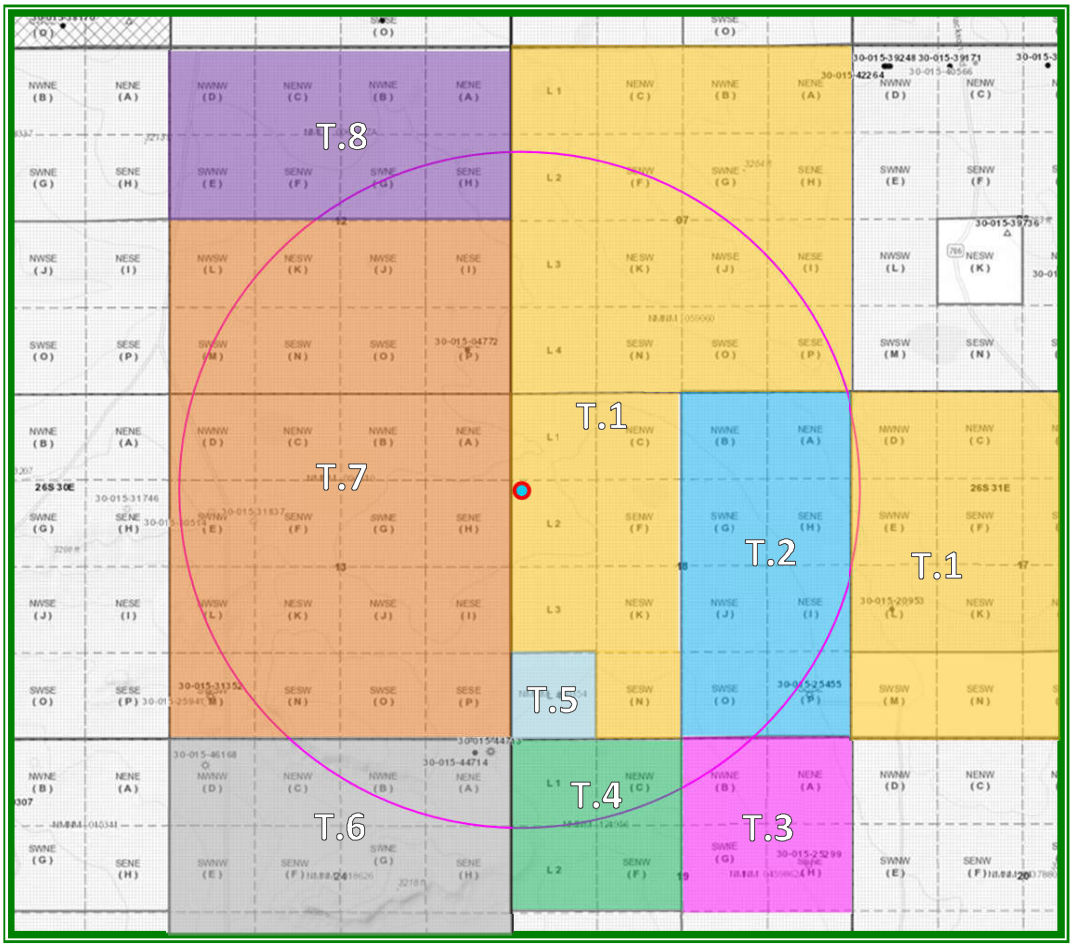
Notification Letter to Interested Parties

Proof of Certified Mailing

Published Legal Notice

Snowman Federal SWD Well No.1 – Affected Parties Plat

(Attachment to NMOCD Form C-108, Application for Authority to Inject.)



TROVE Energy & Water

LEGEND

T.1 – NMNM-059060 – EOG Resources, Inc.

T.2 – NMNM-0438001 – EOG Resources, Inc.

T.3 – NMNM-0459826A – EOG Resources, Inc.

T.4 – NMNM-121956 – EOG Resources, Inc.

T.5 – NMNM-060354 – Boyd & McWilliams

T.6 – NMNM-018626 – Occidental Permian, LP

T.7 – NMNM-094610 – EOG Resources, Inc.

T.8 – NMLC-0068337A – CTV OG NM, LLC, et al

SOS Consulting, LLC

C-108 ITEM XIII – PROOF OF NOTIFICATION
AFFECTED PARTIES LIST

SOS Consulting is providing electronic delivery of C-108 applications.
ALL APPLICABLE AFFECTED PARTIES ARE PROVIDED A LINK IN THE NOTICE LETTER TO A SECURE SOS/ CITRIX SHAREFILE® SITE TO VIEW AND DOWNLOAD A FULL COPY OF THE SUBJECT C-108 APPLICATION IN PDF FORMAT.

"AFFECTED PERSON" MEANS THE DIVISION DESIGNATED OPERATOR; IN THE ABSENCE OF AN OPERATOR, A LESSEE WHOSE INTEREST IS EVIDENCE BY A WRITTEN CONVEYANCE DOCUMENT EITHER OF RECORD OR KNOWN TO THE APPLICANT AS OF THE DATE THE APPLICANT FILES THE APPLICATION; OR IN THE ABSENCE OF AN OPERATOR OR LESSEE, A MINERAL INTEREST OWNER WHOSE INTEREST IS EVIDENCED BY A WRITTEN CONVEYANCE DOCUMENT EITHER OF RECORD OR KNOWN TO THE APPLICANT AS OF THE DATE THE APPLICANT FILED THE APPLICATION FOR PERMIT TO INJECT.; PER OCD RULES NMAC 19.15.26.7, A. AND 19.15.26.8, B.2.

SURFACE OWNER

1 U.S. DEPARTMENT OF INTERIOR
Bureau of Land Management
Oil & Gas Division
620 E. Greene St.
Carlsbad, NM 88220
Certified: 7018 2290 0001 2038 6759

OFFSET MINERALS LESSEES and OPERATORS (All Notified via USPS Certified Mail)

BLM Leases NMNM-059060, 0438001, 0459826A, 121956, 094610 (T.1, T.2, T.3, T.4 and T.7)
Lessee & Operator
2 EOG RESOURCES, INC.
Attn: Chuck Moran
5509 Champions Drive
Midland, TX 79706
Certified: 7018 2290 0001 2038 6766

BLM Lease NMNM-060354 (T.5 on Map)
Lessee
3 BOYD & McWILLIAMS ENERGY GROUP, INC.
550 W Texas
Midland, TX 79701
Certified: 7018 2290 0001 2038 6773

BLM Lease NMNM-018626 (T.6 on Map)
Lessee
4 OCCIDENTAL PERMIAN, LTD
6001 Deauville Blvd.
Midland, TX 79706
Certified: 7018 2290 0001 2038 6780

Operator (T.6)
5 MEWBOURNE OIL COMPANY
Attn: Tim Harrington
P.O. Box 7698
Tyler, TX 75711
Certified: 7018 2290 0001 2038 6797

C-108 ITEM XIII – PROOF OF NOTIFICATION
AFFECTED PARTIES LIST (cont.)

BLM Lease NMLC-00638337A (T.8 on Map)
Lessee
6 CTV OG NM, LLC et al
201 Main Street, Ste.2700
Fort Worth, TX 76102
Certified: 7018 2290 0001 2038 6803
Lessees
CTV O&G NM, LLC
KEYSTONE OG NM LLC
LMBI OG NM LLC
SRBI OG NM LLC
THRU LINE OG NM LLC

OFFSET MINERALS OWNERS (Notified via USPS Certified Mail)

U.S. DEPARTMENT OF INTERIOR
Bureau of Land Management
Oil & Gas Division
620 E. Greene St.
Carlsbad, NM 88220

REGULATORY

NEW MEXICO OIL CONSERVATION DIVISION (Filed to OCD Online)
1220 S. St. Francis Dr.
Santa Fe, NM 87505

NEW MEXICO OIL CONSERVATION DIVISION (FedEx'ed copy)
811 S. First St.
Artesia, NM 88210

November 22, 2019

NOTIFICATION TO INTERESTED PARTIES
via U.S. Certified Mail – Return Receipt Requested

To Whom It May Concern:

Trove Energy and Water, LLC, Hobbs, New Mexico, is preparing applications to the New Mexico Oil Conservation Division to drill and complete for salt water disposal the Snowman Federal SWD Well No.1. The proposed commercial operation will be for produced water disposal from area operators. As indicated in the notice below, the well will be located in Section 18, Township 26 South, Range 31 East in Eddy County, New Mexico.

The published notice states that the interval will be from 16,600 feet to 18,500 feet into the Devonian and Silurian formations.

Following is the notice published in the Artesia Daily Press, Artesia, New Mexico on or about November 13, 2019.

LEGAL NOTICE

Trove Energy and Water, LLC, 1919 North Turner, Hobbs, NM 88240, is filing Form C-108 (Application for Authority to Inject) with the New Mexico Oil Conservation Division seeking administrative approval for a salt water disposal well. The proposed well, the Snowman Federal SWD Well No.1 will be located 1470' FNL and 150' FWL, Section 18, Township 26 South, Range 31 East, Eddy County, New Mexico; approximately 19.3 miles southeast of Malaga, NM.

Produced water from area production will be commercially disposed into the Devonian, Silurian and Fusselman formations at a maximum interval depth of 16,600' to 18,500' at a maximum surface pressure of 3320 psi and a rate limited only by such pressure. Mudlogging and e-logs will confirm final interval depths.

Interested parties wishing to object to the proposed application must file with the New Mexico Oil Conservation Division, 1220 St. Francis Dr., Santa Fe, NM 87505, (505)476-3460 within 15 days of the date of this notice or the OCD receive date, whichever is later. Additional information may be obtained from the applicant's agent, SOS Consulting, LLC, (903)488-9850 or, email info@sosconsulting.us.

You have been identified as a party who may be interested as an offset lessee or operator.

You are entitled to a full copy of the application. A full copy in PDF format is stored on SOS Consulting servers. You may call SOS Consulting, LLC at 903-488-9850, or email info@sosconsulting.us, and the PDF file copy will be expedited to you via email.

Please use a subject like "**Snowman Fed SWD #1 Nov 2019 PDF Copy Request**".

Thank you for your attention in this matter.

Best regards,

Ben Stone, SOS Consulting, LLC
Agent for Trove Energy and Water, LLC

Cc: Application File

SOS Consulting is committed to providing superior quality work using technology to assist clients and affected parties in obtaining the documentation required. SOS will continue to utilize methods which are less energy and resource intensive including, the reduction of paper copies.

We hope you'll partner with us and appreciate these efforts.

C-108 – Item XIV

Proof of Notice - Certified Mail Receipts

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620 E. Greene St.
Carlsbad, NM 88220

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EOG RESOURCES, INC.
Attn: Chuck Moran
5509 Champions Drive
Midland, TX 79706

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BOYD & MCWILLIAMS ENERGY GROUP
550 W Texas
Midland, TX 79701

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MEWBOURNE OIL COMPANY
Attn: Tim Harrington
P.O. Box 7698
Tyler, TX 75711

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- Adult Signature Restricted Delivery $

Postage $

Total Postage and Fees $ 6.85

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NOV 23 2019
USPS

7018 2290 0001 2038 6803

Sent To
CTV OG NM, LLC et al
201 Main Street, Ste.2700
Fort Worth, TX 76102

PS Form 3800

Affidavit of Publication

STATE OF NEW MEXICO
COUNTY OF LEA

I, Todd Bailey, Editor of the Hobbs News-Sun, a newspaper published at Hobbs, New Mexico, solemnly swear that the clipping attached hereto was published in the regular and entire issue of said newspaper, and not a supplement thereof for a period of 1 issue(s).

Beginning with the issue dated
November 13, 2019
and ending with the issue dated
November 13, 2019.

Editor

Sworn and subscribed to before me this
13th day of November 2019.

Business Manager

My commission expires
January 29, 2023
(Seal)

OFFICIAL SEAL
GUSSIE BLACK
Notary Public
State of New Mexico
My Commission Expires 1-29-23

This newspaper is duly qualified to publish legal notices or advertisements within the meaning of Section 3, Chapter 167, Laws of 1937 and payment of fees for said

LEGAL NOTICE
NOVEMBER 13, 2019

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#34850

67104420 00236040

BEN STONE
SOS CONSULTING, LLC.
P.O. BOX 300
COMO, TX 75431